In the United States Court of Federal Claims

Nos. 03-2622C and 04-33C

(Filed Under Seal: May 5, 2010)
(Reissued for Publication: May 17, 2010)[1]

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC., and ENTERGY NUCLEAR INDIAN POINT 2, LLC, Plaintiffs, v. THE UNITED STATES, Defendant.	Spent Nuclear Fuel Case; Nuclear Waste Policy Act of 1982; Sale of Nuclear Power Plant; Assignment of DOE's Standard Contract; Seller's Claim for Damages Measured by Diminution in Sales Price; Buyer's Claim for Mitigation Damages Due to DOE's Partial Breach of Standard Contract.

David A. Churchill, with whom were *Julie M. Carpenter*, *Thomas H. Kim*, and *Adam G. Unikowsky*, Jenner & Block LLP, Washington, D.C., for Plaintiff Consolidated Edison Company of New York, Inc.

Alex D. Tomaszczuk, with whom were *Jay E. Silberg*, *Daniel S. Herzfeld*, *Jack Y. Chu*, *Esther K. Yeu*, and *Evan D. Wesser*, Pillsbury Winthrop Shaw Pittman LLP, McLean, Virginia and Washington, D.C., *L. Jager Smith, Jr.*, Wise Carter Child & Caraway, P.A., Jackson, Mississippi, Of Counsel, for Plaintiff Entergy Nuclear Indian Point 2, LLC.

Andrew P. Averbach and *Patrick B. Bryan*, with whom were *Tony West*, Assistant Attorney General, *Jeanne E. Davidson*, Director, and *Alan J. Lo Re*, Assistant Director, United States Department of Justice, Civil Division, Commercial Litigation Branch, Washington, D.C.,

[1] The Court issued this opinion under seal on May 5, 2010, and gave the parties until May 17, 2010 to submit any proposed redactions of competition-sensitive, proprietary, confidential or other protected information. The parties did not submit any proposed redactions, and therefore this opinion is released in its entirety for publication.

Jane K. Taylor, *Harold D. Lester*, *Joseph E. Ashman*, *Scott R. Damelin*, *Michelle R. Milberg*, *Anthony W. Moses*, *Shari A. Rose*, and *Scott D. Slater*, Of Counsel, for Defendant.

OPINION AND ORDER

WHEELER, Judge.

This case involves the damages claims of Plaintiffs Consolidated Edison Company of New York, Inc. ("Con Ed") and Entergy Nuclear Indian Point 2, LLC ("Entergy") caused by the failure of the Department of Energy ("DOE") to collect and dispose of spent nuclear fuel. Under the terms of DOE's June 1983 Standard Contract, DOE was to begin collecting spent nuclear fuel at the Indian Point nuclear facility ("Indian Point") by January 31, 1998. Indian Point is a three-reactor nuclear power plant located on the Hudson River near Buchanan, New York, 25 miles north of New York City. Con Ed sold two of Indian Point's reactors, Units 1 and 2, to Entergy on September 6, 2001. The claims of both Con Ed and Entergy arise from their ownership and operation of the same Indian Point nuclear facility. The Court therefore joined their claims together for trial and decision. Consol. Edison Co. of N.Y. v. United States, 83 Fed. Cl. 455, 459 (2008).

The Court has jurisdiction over Plaintiffs' claims pursuant to the Tucker Act, 28 U.S.C. § 1491(a) (2006). See PSEG Nuclear, LLC v. United States, 465 F.3d 1343, 1349 (Fed. Cir. 2006). Defendant's liability for partial breach of the Standard Contract is well established. Carolina Power & Light Co. v. United States, 82 Fed. Cl. 23, 26 (2008), aff'd in relevant part, 573 F.3d 1271 (Fed. Cir. 2009) (citing Ind. Mich. Power Co. v. United States, 422 F.3d 1369, 1376-77 (Fed. Cir. 2005)); Yankee Atomic Elec. Co. v. United States, 536 F.3d 1268, 1272 (Fed. Cir. 2008); Maine Yankee Atomic Power Co. v. United States, 225 F.3d 1336, 1342 (Fed. Cir. 2000) ("The breach involved all the utilities that had signed the contract – the entire nuclear electric industry."). In this case, the Court previously granted summary judgment on liability for Entergy. Entergy Nuclear Indian Point 2, LLC v. United States, 64 Fed. Cl. 515 (2005). The Court also granted partial summary judgment in favor of Con Ed and Entergy regarding the rate at which DOE was required to accept spent nuclear fuel from utilities under the Standard Contract. Consol. Edison Co. of N.Y. v. United States, Nos. 03-2662C, 04-033C (Fed. Cl., May 18, 2009) ("Order, May 18, 2009"). Consistent with the Federal Circuit's ruling in Pacific Gas & Electric Co. v. United States, 536 F.3d 1282, 1292 (Fed. Cir. 2008), the applicable acceptance rate is found in DOE's 1987 Annual Capacity Report and the 1987 Mission Plan Amendment.

Pursuant to Indiana Michigan, the Court must treat DOE's failure to perform the Standard Contract as a partial breach. 422 F.3d at 1375-77. Although DOE has not commenced any spent nuclear fuel collection in the twelve years since its obligation arose, the parties have not repudiated the Standard Contract. Rather, DOE continues to collect the

fees from plant owners required under the Standard Contract, and the parties expect that some day DOE will perform. The nuclear utilities may recover their incurred costs in mitigating the partial breach, but may not recover future expenses. Id. at 1377 ("If the breach of an entire contract is only partial, the plaintiff can recover only such damages as he or she has sustained, leaving prospective damages to a later suit in the event of future breaches.") (citing 22 Am. Jur. 2d Damages § 988 (2003)); see also Yankee Atomic Elec. Co., 536 F.3d at 1282.

The Con Ed portion of this case, involving a post-breach sale of a nuclear plant and alleged damages measured by a diminution in plant value resulting from DOE's breach, is similar to Boston Edison Co. v. United States, 80 Fed. Cl. 468 (2008), appeal dismissed, 299 Fed. Appx. 956 (Fed. Cir. 2008). Con Ed's claims total $137,489,087, and are comprised of the following six items: (1) payments to external vendors and internal labor costs for studies relating to spent nuclear fuel storage alternatives ($871,634); (2) payments to Private Fuel Storage, LLC, a joint off-site venture for potential storage of spent nuclear fuel ($5,942,900); (3) additional decommissioning funds transferred to Entergy to account for spent nuclear fuel costs ($23,000,000); (4) diminished sales price due to DOE's breach ($24,034,827); (5) a reduction in Entergy's purchase price as a result of the unavailability of project debt financing ($64,874,776); and (6) over-funding of the decommissioning fund ($18,764,950). Conceptually, the first two items represent costs incurred when Con Ed owned Indian Point Units 1 and 2, and the remainder relate to damages that Con Ed allegedly suffered when it sold Indian Point Units 1 and 2 to Entergy. Defendant opposes Con Ed's claims in their entirety.

Entergy's claims total $136,811,374, and consist of the following ten items: (1) costs incurred in constructing and operating a dry storage facility for spent fuel ($21,934,275); (2) Unit 2 plant modification costs ($41,483,226); (3) Unit 2 dry cask equipment costs ($11,790,480); (4) preparation and loading costs of dry cask storage at Unit 2 ($5,983,644); (5) dry cask storage and equipment costs at Unit 1 ($26,501,939); (6) costs of continued operation and maintenance of the Unit 1 spent fuel pools ($9,158,553); (7) costs relating to the control and monitoring of spent fuel pool leaks at Unit 1 ($15,437,371); (8) payment of excess fees to the Nuclear Regulatory Commission ("NRC") ($2,148,901); (9) costs of participating in the Private Fuel Storage venture ($1,598,200); and (10) payment of additional property taxes due to the construction of the dry storage facility at Unit 2 ($774,785). Entergy added a cost of capital element that would raise its total claim to $157,650,000. Entergy presented its damages claim for costs incurred through August 31, 2008. Defendant concedes liability to Entergy of $89,388,884, but opposes the balance of Entergy's claims.

Defendant's foremost objection to Con Ed's and Entergy's claims is that DOE signed one Standard Contract at Indian Point and committed one breach in failing to collect the

plant's spent fuel when required. Defendant asserts that neither Con Ed nor Entergy should receive additional damages merely because Con Ed sold Indian Point Units 1 and 2 to Entergy. In Defendant's view, the damages consist of "one pie," to be divided between the two plaintiffs. To the extent that the Court awards damages to Con Ed and Entergy in excess of the "pie," Defendant says the Court would be impermissibly allowing the damages to increase as a result of the sale. To avoid the possibility of a double recovery, the Court must be alert to any overlapping claims, and recognize when damages awarded to one plaintiff should be offset against the claims of the other.

Defendant also asserts that Con Ed and Entergy voluntarily divided their rights at the time of sale, with Con Ed retaining claims against DOE that accrued prior to the closing date, and Entergy receiving the right to bring claims accruing on or after the closing date. According to Defendant, Con Ed's voluntary relinquishment of its rights prevents Con Ed from claiming damages against DOE for any diminished value in Indian Point's sale price, or any other costs relating to the sale. Aside from the provisions in the sales agreement, Defendant contends that the evidence does not support a finding in Con Ed's favor on any of the claims relating to the sale.

With regard to Entergy's claims, and while conceding a significant portion of the claims, Defendant maintains that Entergy would have incurred some of the claimed costs even if DOE had begun to collect spent fuel as required by the Standard Contract. Defendant states that other Entergy costs were not related to DOE's delay, and were not caused by the breach of the Standard Contract. Defendant also objects to certain overhead costs, such as capital suspense and material "loaders," which allegedly did not change as a result of DOE's breach.[2]

The Court made a site visit to the Indian Point nuclear facility on May 27, 2009, and thereafter conducted a nineteen-day trial in Washington, D.C. during June 1-26, 2009. The Court heard the evidence on Con Ed's damages claims first, followed by Entergy's damages claims. Defendant presented its rebuttal case in two segments, first at the close of Con Ed's claims, and then at the close of Entergy's claims. The Court received the testimony of 39 witnesses, eight of whom were expert witnesses. The Court's evidentiary record consists of 5,774 transcript pages, and more than 400 documentary exhibits. The parties submitted post-trial briefs on September 1, 2009, and reply briefs on October 16, 2009. The Court heard

---

[2] Defendant asserted a further defense in this case based upon the "unavoidable delays" clause of the Standard Contract, arguing that DOE's failure to collect spent nuclear fuel as required was attributable to excusable causes. Based upon the Federal Circuit's recent decision in Nebraska Public Power District v. United States, 590 F.3d 1357 (Fed. Cir. 2010), the Court will not address the "unavoidable delays" defense in this opinion.

closing arguments on December 4, 2009. Defendant submitted a Notice of Additional Authority on December 24, 2009, bringing to the Court's attention the decision in Wisconsin Electric Power Co. v. United States, 90 Fed. Cl. 714 (2009), appeal docketed, No. 10-5088C (Fed. Cir. Feb. 25, 2010). Con Ed responded to this Notice of Additional Authority on January 8, 2010. Before the Court issued this decision, and at the Court's request, Entergy and Defendant filed additional information on April 21, 2010 to assist in the proper calculation of damages.

In brief summary, the Court concludes that Con Ed is entitled to recover $448,859 for its payments to external vendors relating to spent nuclear fuel studies. These were reasonable expenses incurred by Con Ed to assess its alternatives after learning that DOE would not begin collecting spent fuel in 1998, as provided in the Standard Contract. Con Ed's other claims are denied because they were not proven with reasonable certainty, or they were voluntarily relinquished at the time of sale to Entergy. While all of Con Ed's claims will be addressed in detail below, the Court observes that Con Ed's payments of $5,942,900 to Private Fuel Storage may well have been a reasonable step in considering potential off-site storage options for spent fuel, but Con Ed unequivocally assigned these interests to Entergy "for value received" at the time of sale. Similarly, Con Ed failed to preserve its rights to assert diminished value claims in the sale agreement, since it retained only claims that accrued *prior to the closing date*.[3] Moreover, the Court finds Con Ed's diminished value claims to be speculative, and contrary to the evidence.

Entergy is entitled to recover $106,123,527. The Court reached this determination by starting with the uncontested amount of $89,388,884, and awarding additional recovery for the following disputed items: (1) extended operating and maintenance costs for the Unit 1 spent fuel pools for 2004-2008; (2) Unit 1 north curtain drain project; (3) removal of diesel tanks; (4) disposal of radioactive waste; (5) damaged fuel canisters; (6) loading activities, such as development of loading procedures and personnel training; (7) refurbishment of Unit 1 crane; (8) refurbishment of Unit 1 fuel handling tools; (9) Unit 2 spent fuel characterization and visual inspection; and (10) additional NRC fees. Further, the Court has allowed recovery of Entergy's internal labor costs and materials "loader" overhead expense where appropriate in the above categories.

The Court has denied Entergy's claims in the following areas: (1) unsupported operating and maintenance costs for 2002 and 2003; (2) groundwater project management allocation error; (3) purchase of debris canisters and preparation of sludge clean-up for Unit 1 spent fuel pools; (4) Unit 1 stabilization for SAFSTOR; (5) site characterization of

---

[3] The language of Con Ed's sale agreement, where Con Ed retained claims that accrued *prior to the closing date*, presents a key distinction from the sale agreement in Boston Edison, where the seller reserved claims that had accrued *as of* the closing date. 80 Fed. Cl. at 470, 477.

groundwater; (6) clean-up activities for Unit 1 pools; (7) work on Unit 1 ventilation system; (8) Private Fuel Storage payments; (9) capital suspense "loader" overhead expense; and (10) cost of capital. Mainly, these claim items consist of expenses that would have been incurred in the absence of DOE's breach, are unsupported by Entergy's accounting records, or are not allowed by law. The Court will address each of Entergy claims in detail below.

Findings of Fact[4]

A. Indian Point Nuclear Plant

Indian Point is a three-reactor nuclear plant located approximately 25 miles north of New York City on the Hudson River. (Stip. ¶ 1.)[5] Indian Point Unit 1 began commercial operation in September 1962, and was permanently shut down in October 1974. (Stip. ¶ 2.) Indian Point Unit 2 began commercial operation in August 1974, and currently is licensed to operate until September 2013. Id. Indian Point Unit 3 began commercial operation in August 1976, and currently is licensed to operate until December 2015. Id. Only Indian Point Units 1 and 2 are involved in this case. Entergy also has damages claims regarding Indian Point Unit 3, but they are pending before the Court in another case, Entergy Nuclear Fitzpatrick, LLC v. United States, No. 03-2627C (Fed. Cl. compl. filed Nov. 5, 2003).

Indian Point Unit 1 has five interconnected spent fuel pools, which are concrete structures sitting on bedrock with an epoxy coating on the interior surface. (Mayer, Tr. 3778, 3819, 3826.) Con Ed applied an epoxy coating to the Unit 1 pools to prevent the radioactive water from making contact with the concrete. (Brewer, Tr. 5463-64.) Because of the porous nature of concrete, any water placed in a concrete pool would leak through the walls and floor of the pool without a coating or liner. (English, Tr. 3925-26; Mayer, Tr. 3819; Brewer, Tr. 5463-64.) Con Ed first applied the epoxy coating when plant operations began at Unit 1 in the early 1960s, and it was never replaced or repaired. (Mayer, Tr. 3819.) The epoxy coating failed over time and pulled away from the concrete. (Mayer, Tr. 3819; English, Tr. 3933.) Currently, there are areas in the Unit 1 pools where the epoxy coating is missing. (Mayer, Tr. 3819.) When Con Ed discontinued reactor operations at Unit 1 in 1974, the 160 assemblies in the reactor were moved to the spent fuel pools. (Mayer, Tr. 3743; Weiss, Tr.

---

[4] This statement of facts constitutes the Court's principal findings of fact under Rule 52(a) of the Court. Other findings of fact and rulings on mixed questions of fact and law are set forth later in the analysis.

[5] In this opinion, the Court will refer to the trial transcript by witness and page as "Name, Tr. __" and to trial exhibits as "CX __" for Con Ed's exhibits, "EX __" for Entergy's exhibits, and "DX __" for Defendant's exhibits. The parties' stipulations of fact, filed on May 13, 2009, are referred to as "Stip. ¶ __." For lengthy exhibits, citations include a page number where available. Demonstrative exhibits from Plaintiffs and Defendant are referred to as "CDX __," "EDX __," and "DDX __" respectively.

4140.) In 2008, Entergy removed the last of the fuel assemblies from the Unit 1 pools, and the pools were drained. (Mayer, Tr. 3744.) The Unit 1 pools were not designed for the continuous storage of spent fuel. In the 1960s, when Unit 1 was constructed and placed in service, Con Ed anticipated that spent fuel would be transported off-site for reprocessing. (English, Tr. 3926-27.)

The Indian Point Unit 1 spent fuel pools have a history of leaking. Although the date of first leakage is unknown, water could have been leaking since the 1960s when Unit 1 began operation. (Hinrichs, Tr. 4340-41; DX 390 at 33.) Con Ed confirmed the leakage from the Unit 1 spent fuel pools in 1994, when it determined that water generally was leaking from multiple locations at a rate of 25 to 150 gallons per day. (Mayer, Tr. 3820-21; English, Tr. 3934-38.) On occasion, the pools leaked as much as 800 gallons per day. (DX 390 at 33.) To address these leaks, Con Ed modified the north curtain drain system, originally installed to reduce structural loads on the Unit 1 foundations resulting from groundwater, to collect and monitor leaked water. (Mayer, Tr. 3823.) The system did not, however, remove radiological contaminants from the water. Id. Con Ed diverted the north curtain drain system, which previously drained into the Hudson River, back into a Unit 1 storage system for monitoring prior to release into the environment. (English, Tr. 3873-76, 3938-39; Mayer, Tr. 3822-23, 3828.) The modification of the curtain drain system was never intended to stop the leakage from the Unit 1 spent fuel pools, but merely to capture all of the existing leakage and thereby eliminate any unmonitored releases. (Mayer, Tr. 3824.) Unknown to Con Ed, the modification of the Unit 1 curtain drain system did not result in the collection of all the leaked water from the pools. (Mayer, Tr. 3825-26; English, Tr. 3940.) As a result, contaminated water leaked from the Unit 1 spent fuel pools into surrounding soil, the groundwater, and eventually the Hudson River. Id. This leakage continued until Entergy drained the pools in 2008. (Mayer, Tr. 3744.) The amount of contaminated water that leaked from the Unit 1 spent fuel pools and bypassed the curtain drain system is unknown. (Mayer, Tr. 3826.)

The Indian Point Unit 2 reactor is a 1020-megawatt electric Westinghouse four-loop pressurized light water reactor ("PWR"). (Stip. ¶ 22.) Nuclear fuel at Unit 2 consists of uranium pellets, which are sealed inside long metal "fuel rods." (Stip. ¶ 23.) Each fuel rod is a zirconium alloy tube containing the cylindrical pellets of enriched uranium. Id. A square array of bundled fuel rods constitutes an individual fuel "assembly." Id. After a PWR fuel assembly has been used to generate nuclear fission for typically three cycles (each cycle lasting 12–18 months), these assemblies become "spent," and can no longer be used to produce electric power. (Stip. ¶ 24.) The assemblies are then categorized as spent nuclear fuel. Id. The Unit 2 reactor core holds 193 assemblies. (Stip. ¶ 27.)

Assemblies discharged from the reactor core as spent fuel are transferred to a "spent fuel pool" on the premises of the reactor. (Stip. ¶ 25.) This large indoor pool of water cools

the spent fuel assemblies and shields reactor personnel from radiation emitted from the assemblies. Id. The Indian Point Unit 2 spent fuel pool walls are made of reinforced concrete, approximately four feet thick. However, unlike the epoxy coated Unit 1 pools, the interior of the Unit 2 pool is lined with stainless steel to prevent the water from making contact with the concrete. (Schwartz, Tr. 3478.) Soluble boron is added to the water to aid in the capture of neutrons released from the spent fuel. (Stip. ¶ 25.) When the spent fuel assemblies are properly submerged, additional radiation shielding is not required. Id.

The Unit 2 spent fuel pool has been "re-racked" three times (in 1973, 1982, and 1990) to allow fuel assemblies to be placed closer together, which has increased the total licensed storage capacity of the spent fuel pool from 262 to 1,374 assemblies. (Stip. ¶ 28.) The Unit 2 spent fuel pool's stainless steel liner was damaged during a 1990 re-racking operation, which resulted in contaminated pool water migrating through the liner and the concrete pool wall to the exterior surface of the pool wall. (Brewer, Tr. 5471; Mayer, Tr. 3831.) The Unit 2 leak caused by the liner tear was not identified and repaired until 1992, and it is estimated that at least 20,000 gallons of contaminated pool water leaked through the liner into the ground during that period. (Brewer, Tr. 5471-72; DX 390 at 35.) The Unit 2 spent fuel pool is an older design, and is the only operating commercial plant without a leak detection system in its liner. (Brewer, Tr. 5470-71; DX 390 at 34.)

In 2005, during an excavation relating to the installation of the Unit 2 gantry crane, Entergy detected water coming through shrinkage cracks in the Unit 2 spent fuel pool wall. (Skonieczny, Tr. 3655-56.) Upon discovering moisture outside the Unit 2 spent fuel pool, Entergy commenced a groundwater investigation around Indian Point. (Mayer, Tr. 3748, 3787.) Entergy concluded that – contrary to prior belief – the modification to the curtain drain system around Unit 1 in the 1990s had not fully contained the leaks from the Unit 1 spent fuel pools, and that the leaks were continuing. (English, Tr. 3876-78; Mayer, Tr. 3829, 3838-39; Brewer, Tr. 5465-67; DX 390 at 35.) In addition, in 2007, Entergy discovered a pinhole leak in the Unit 2 transfer canal, a construction defect that had existed since 1973. (Hinrichs, Tr. 4347-49; Mayer, Tr. 3833-35; DX 390 at 35.) The amount of water that had leaked through the pinhole leak was never determined. (Hinrichs, Tr. 4348.) Ultimately, Entergy's investigation concluded that the leakage from the pinhole defect in the Unit 2 transfer canal had migrated to the groundwater. (Mayer, Tr. 3835.)

On November 9, 2000, Con Ed and Entergy entered into an Asset Purchase and Sale Agreement ("APSA"), in which Entergy agreed to acquire Indian Point Units 1 and 2. The sale closed on September 6, 2001. Entergy is the second largest nuclear operating company in the United States, owning approximately ten nuclear power plants. (Reed, Tr. 2057.) Entergy has purchased at least six operating nuclear reactors since the deregulation of the nuclear power industry in the late 1990s. (Reed, Tr. 2057-58.)

At the time of the Indian Point auction in 2000, 990 of the 1,374 available cells in the Unit 2 spent fuel pool were filled with discharged spent fuel, 166 were restricted because of degradation of the chemical known as Boraflex, 14 were obstructed or otherwise occupied, and 193 needed to remain empty in order to maintain full core discharge capability. (Sanchez, Tr. 171-76.) Thus, only 11 of the 1,374 total pool cells were available to accommodate spent fuel. (Sanchez, Tr. 176; CDX 5.)

B. The Nuclear Waste Policy Act

In the 1960s, the Federal Government required the spent fuel generated by nuclear plants to be reprocessed into reusable uranium and plutonium. The spent fuel pools at Indian Point Units 1 and 2 were not designed for long-term storage of spent fuel. Rather, they were designed with the assumption that spent fuel would remain in the pool only for a limited cooling period, and then be transported off-site for reprocessing. (Gueron, Tr. 68.) The physical dimensions of the Unit 1 and 2 spent fuel pools are part of the original structure of the plants, and cannot be changed without major modification. (Gueron, Tr. 71; Sanchez, Tr. 168.)

In 1977, President Carter announced that the reprocessing of spent nuclear fuel and the development of advanced plutonium-based reactors in the United States would be suspended indefinitely. President Carter took this action to curb the potential proliferation of nuclear weapons arising from an expanded plutonium-based nuclear economy. See H.R. Rep. No. 97-491(I), at 27 (1982), reprinted in 1982 U.S.C.C.A.N. 3792, 3794. Prior to 1977, nuclear plants shipped their spent fuel to off-site reprocessing facilities. (Weiss, Tr. 4155.) Con Ed shipped 270 spent fuel assemblies to a reprocessing facility in West Valley, New York in 1972. (English, Tr. 3866.) However, President Carter's policy change ended reprocessing efforts, and created a spent fuel bottleneck in the United States. If plant operations were to continue, spent fuel would have to be removed and stored somewhere outside of the spent fuel pools, or nuclear plants would need to expand their storage capacity. See H.R. Rep. No. 97-785, pt. 1, at 47 (1982).

On January 7, 1983, Congress attempted to address spent fuel disposal issues by enacting the Nuclear Waste Policy Act of 1982 ("NWPA"), Pub. L. No. 97-425, 96 Stat. 2201 (codified at 42 U.S.C. §§ 10131-10270 (2006)). In passing the NWPA, Congress recognized that "radioactive waste creates potential risks and requires safe and environmentally acceptable methods of disposal," and that "a national problem has been created by the accumulation of . . . spent nuclear fuel . . . ." § 10131(a)(1)-(2). Congress also determined that:

> [W]hile the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel.

§ 10131(a)(4). The NWPA created an arrangement whereby utilities would pay fees into the Nuclear Waste Fund in exchange for the Government's performance of spent fuel disposal services. See § 10131(a)(5). The NWPA mandated that commercial nuclear utilities enter into contracts with DOE for the provision of spent fuel removal services, the costs of which would be borne by the "generators and owners." See §§ 10131(b)(4), 10222(a)(1). Congress required that the utilities' fees be sufficient to support the costs of DOE's spent fuel disposal efforts. §10222(a)(2)-(3). The NWPA specified that the generators and owners of spent fuel would pay the cost of interim storage of the spent fuel "until such waste and spent fuel is accepted by the Secretary of Energy in accordance with the provisions of this chapter." § 10131(a)(5). DOE was required by a Standard Contract with each nuclear plant operator to begin accepting spent nuclear fuel no later than January 31, 1998. 10 C.F.R. §961.11. DOE contemplated the establishment of two central repositories, and an interim storage facility if needed, where the spent fuel would be stored. One of those repositories was to be located at Yucca Mountain, Nevada. To date, the central repositories and interim storage facilities have not been completed, and DOE has not collected, accepted, or disposed of any spent nuclear fuel from any Standard Contract signatory. Despite DOE's failure to perform its duties under the Standard Contract, nuclear plant owners continue to pay billions in fees to DOE.

C. The Standard Contract and DOE's Breach

On February 4, 1983, DOE published in the Federal Register the proposed terms for the "Standard Contract for Disposal of Spent Nuclear Fuel and/or High Level Radioactive Waste." 48 Fed. Reg. 5458 (Feb. 4, 1983) (codified at 10 C.F.R. § 961.11). Nuclear plant owners and operators were required to enter into DOE's Standard Contract as a condition to obtaining renewal of their operating licenses. Ind. Mich., 422 F.2d at 1372 (citing 42 U.S.C. § 10222(a)(1)). Pursuant to the NWPA, on or about June 17, 1983, Con Ed executed the Standard Contract with DOE, covering Indian Point Units 1 and 2. (Stip. ¶ 16.) Under the Standard Contract, Con Ed was required to pay a quarterly fee in the amount of 1.0 mill (one-tenth of one cent) per kilowatt-hour on electricity generated on or after April 7, 1983, plus a one-time fee for spent fuel produced from electricity generated prior to April 7, 1983. (CX 37 at 18-20.) Con Ed paid all of its required fees under the Standard Contract. (Gueron, Tr. 101.)

In 1987, four years after Con Ed entered into the Standard Contract, DOE issued its Mission Plan Amendment ("MPA") detailing the need for Congress to authorize the building of an interim storage facility, the Monitored Retrievable Storage ("MRS") facility, to assure that DOE could begin timely disposal of spent fuel by 1998. (EX 43 at Section F.3, "Contingency Plans.") In its request to Congress, DOE stated: "If Congress does not approve the MRS facility, the transfers of waste to DOE facilities may not be able to begin in 1998." Id. In response, Congress passed the Nuclear Waste Policy Amendments Act, which authorized DOE to build the desired MRS facility, with certain scheduling linkages to the permanent repositories. Pub. L. No. 100-203, § 5021, 101 Stat. 1330-227, 1330-236 (1987) (codified, as amended, at 42 U.S.C. § 10168(d)(1) (2006)). Later, DOE acknowledged that construction and operation of an MRS facility would not be feasible by 1998 unless Congress removed the linkages between the MRS facility and the permanent repositories. See Sys. Fuels, Inc. v. United States, 79 Fed. Cl. 37, 45 (2007), appeal docketed, No. 08-5025 (Fed. Cir. Jan. 9, 2008) ("Sys. Fuels I"). DOE ultimately abandoned its plan to build an MRS. Id. at 57. In 1994, DOE pronounced that it "ha[d] no statutory obligation to accept spent nuclear fuel beginning in 1998 in the absence of an operational repository . . . ." Notice of Inquiry, 59 Fed. Reg. 27,008 (May 25, 1994). One year later, DOE issued its "Final Interpretation of Nuclear Waste Acceptance Issues," which reiterated that DOE had no obligation to accept spent fuel in 1998, and declared that DOE's performance would commence in 2010, at the earliest. 60 Fed. Reg. 21,795 (May 3, 1995). In 1996 and 1997, the United States Court of Appeals for the District of Columbia Circuit rejected DOE's interpretation of its obligation under the NWPA. See Ind. Mich. Power Co. v. Dep't of Energy, 88 F.3d 1272, 1273 (D.C. Cir. 1996); see also Northern States Power Co. v. Dep't of Energy, 128 F.3d 754, 758-60 (D.C. Cir. 1997) (concluding that DOE cannot avoid its obligations under the NWPA by repeatedly advancing the flawed position that its delay is unavoidable because it lacks an operational repository for spent fuel). The NWPA clearly directs DOE to undertake its duty of accepting spent fuel by January 31, 1998, regardless of whether it has a repository or interim storage facility. Northern States Power Co., 128 F.3d at 760.

On September 6, 2001, the closing date of the sale of Indian Point to Entergy, Con Ed sent a letter to DOE. This letter stated that pursuant to Article XIV of the Standard Contract and as part of Indian Point's sale, Con Ed, "as Purchaser under the [Standard] Contract, has transferred title to the spent nuclear fuel and high-level radioactive waste within the scope of the [Standard] Contract to [Entergy], effective September 6, 2001." (Stip. ¶ 17; CX 500.) This letter also stated that Con Ed "has, effective September 6, 2001, assigned Con Ed's rights and obligations under the [Standard] Contract to Entergy, with the exception of all claims and causes of action in respect to damages to property or economic loss related to or pertaining to the Department of Energy's breaches or defaults under the [Standard] Contract accrued as of September 6, 2001, whether relating to periods prior to or following September 6, 2001." (Stip. ¶ 18; CX 500 (emphasis added.))

Through the September 6, 2001 closing date, the net payments made by Con Ed under the Standard Contract's one-time fee and quarterly payment provisions totaled $128,337,813.74. (Stip. ¶ 19.) As of December 31, 2008, Entergy has paid $54,742,760 to DOE for nuclear waste disposal services at Indian Point Units 1 and 2. (Stip. ¶ 20.) Entergy continues to make timely payments of approximately $5 million per year to DOE for spent fuel disposal services yet to be provided.

D. The Planned Acceptance Rate

The spent fuel acceptance queue is a chronological listing of spent fuel discharges that is embodied in the acceptance priority ranking ("APR") published by DOE. (Supko, Tr. 4536-37.) The APR is an ordinal listing based upon the discharge date[6] of the spent fuel in existence establishing the order in which spent fuel would be collected from nuclear power plants. The Standard Contract stipulates that the ranking is based upon the oldest spent fuel being collected first. (Zabransky, Tr. 5124-25.) Instead of providing for a firm rate of spent fuel acceptance, the Standard Contract obligated DOE to issue an annual capacity report ("ACR") projecting DOE's yearly acceptance capacity for nuclear waste. DOE was required to publish annually an updated APR, and DOE issued several versions between 1991 and 2004. (Supko, Tr. 4538.) DOE published its latest version of the APR in 2004. Id. The 2004 APR captures historical discharge data for each nuclear plant's fuel assemblies from 1967 through December 31, 2002. (Supko, Tr. 4542; EX 26-X, July 9, 2004 Acceptance Priority Ranking & Annual Capacity Report, at 64, Appendix A.) The discharge data includes the fuel assembly number, the burn-up of the fuel assembly,[7] the enrichment of the assembly, and the weight of the assembly. (Supko, Tr. 4541-42.) From 1967 to 2002, the years in which DOE collected discharge data, the total spent fuel discharged from all nuclear plants in the United States was 47,162.8 metric tons of uranium ("MTU").

The Federal Circuit held in Pacific Gas & Electric Co. that the Standard Contract entered into by nuclear plant operators required DOE to accept spent nuclear fuel in accordance with "the 1987 ACR process," defined as incorporating both the 1987 ACR and the 1987 MPA. 536 F.3d at 1292. In accordance with the Federal Circuit's ruling, Con Ed's reasonable presumption in executing its 1983 Standard Contract was that DOE would accept spent fuel using the overall acceptance rates set forth in DOE's 1987 ACR and 1987 MPA. See Order, May 18, 2009. Therefore, based on the 2004 discharge data, and the overall acceptance rates found in DOE's 1987 ACR and 1987 MPA, the owner of Indian Point Units

---

[6] The discharge date is the date that a fuel assembly was permanently discharged from the nuclear reactor, signifying that the fuel has reached the end of its useful life, and would not be put back into the reactor to generate energy. (Supko, Tr. 4540.)

[7] "Burn-up" means the amount of energy per metric ton of uranium that was generated by each fuel assembly. (Supko, Tr. 4541-42.)

1 and 2 would have had the following spent fuel allocation rights: 160 assemblies (30.58 MTU) in 1998; 72 assemblies (32.74 MTU) in 1999; 60 assemblies (27.00 MTU) in 2000; 63 assemblies (28.29 MTU) in 2002; 54 assemblies (24.42 MTU) in 2003; 75 assemblies (33.80 MTU) in 2004; 140 assemblies (63.51 MTU) in 2005; and 68 assemblies (31.07 MTU) in 2006. (Supko Tr. 4579; CX 100 at Appendix A.)

Under the Standard Contract, nuclear plants submitted for approval Delivery Commitment Schedules ("DCSs") advising DOE how the plant intended to use its spent fuel allocation in the ACR so that DOE could plan accordingly. (CX 37 at 11; Zabransky, Tr. 5126, 5203.) Pursuant to its obligations under the Standard Contract, Con Ed submitted DCSs to DOE on September 23, 1992; September 27, 1996; September 24, 1999; September 27, 1999; and September 14, 2000. (EX 32-C-2; EX 32-C-11; EX 32-C-13; EX 32-C-15; EX 32-C-17.) By letter dated March 13, 1997, DOE informed Con Ed that it could not approve further DCSs and waived the requirement for Con Ed to submit these schedules. (EX 32-C-12.) In accordance with the operative DCS instructions, the DCSs that were submitted to DOE by the nuclear industry utilized the 1991 acceptance rates for the allocation of the parties' acceptance rights. (Zabransky, Tr 5186; CX 140 at Section 7(a).)

If DOE had begun accepting spent fuel in 1998, Con Ed stated its preference that DOE accept spent fuel from Unit 2 before Unit 1. (Gueron, Tr. 131.) At that time, Indian Point Unit 2 was the operating plant, whereas Unit 1 was "static," with "nothing . . . coming into it." (Gueron, Tr. 103-04.) Con Ed was "not concerned about losing room in that particular pool." Id. Entergy later formed the view that Unit 1 spent fuel should be removed first, but it did not advocate this view until 2006 when it discovered that the Unit 1 curtain drain system was not capturing all of the leakage from the spent fuel pools. (English, Tr. 3873, 3876-82, 3911-18; CX 144.) In each of Con Ed's DCSs submitted to DOE, Con Ed indicated that, barring a change of plans, spent fuel should be collected first from Indian Point Unit 2. (Zabransky, Tr. 5141-47, 5197-98; EX 32-C-2; EX 32-C-3; EX 32-C-8; EX 32-C-11; EX 32-C-12; EX 32-C-13; EX 32-C-15; EX 32-C-17.) Entergy did not submit any DCSs to DOE for Indian Point, since Entergy did not yet own Units 1 and 2. Con Ed's statements to DOE in the DCSs were not binding upon Entergy, and were not even binding upon Con Ed if there were changes in plans.

E. Con Ed's Auction and Sale of Indian Point Units 1 and 2

In 1993, the New York Public Service Commission ("PSC") instituted a Competitive Opportunities Proceeding to implement deregulation of the electric utility industry in New York State. (CX 248 at 2 ("The goal of the Competitive Opportunities Proceeding was to foster the creation of a fully competitive electric market.").) Three years later, the Federal Energy Regulatory Commission ("FERC") issued Order Nos. 888 and 889 with the intention of restructuring the electric utility industry to promote competition on a national level. (CX 674 at 10.) The FERC orders encouraged publicly regulated utilities to sell their electric

generation assets. (Jee, Tr. 502-03; CX 674 at 10.) As part of the Competitive Opportunities Proceeding and in response to FERC's orders, the PSC entered into settlement agreements with utilities in New York State, including Con Ed, that would require the utilities to divest their fossil electric generating assets. (CX 284 at 2; CX 674 at 10-11.) Pursuant to its agreement with PSC, Con Ed completed the sale of all of its fossil electric generating plants by the summer of 1999. (CX 284 at 2.) After selling its fossil plants, Con Ed owned only one electric generating facility, Indian Point Units 1 and 2. Id. Following the divestment of its fossil electric generating assets, Con Ed altered its business focus to transmission and distribution services. (CX 284 at 3; Jee, Tr. 503-04.) Also, in the late 1990s, unregulated nuclear operators such as Dominion Resources and Entergy began acquiring multiple nuclear power plants, with the expectation of achieving operating efficiencies among the plants. (CX 284 at 3.) Con Ed management believed that, with only one nuclear facility, it could not compete effectively with these operators of multiple nuclear plants. (CX 284 at 3; Jee, Tr. 504-05.)

Mr. George Jee, director of Con Ed's energy management resource planning group, prepared a memorandum identifying the significant factors driving Con Ed's decision to sell Indian Point. (CX 285; Jee, Tr. 500-01.) Such factors included: (1) Con Ed's divestiture of its fossil plants in response to the PSC's Competitive Opportunities Proceeding; (2) the transformation of the electric utility industry into a competitive market with the emergence of operators of multiple nuclear plants; (3) the inability of Con Ed as the owner of a single plant to compete with the operators of multiple plants; and (4) PSC's Nuclear Proceeding implementing deregulation of the nuclear power industry in New York State, which made the sale of Indian Point the "next natural step" for Con Ed. (CX 285.) In January 2000, Con Ed commenced a two-phase auction to sell Indian Point Units 1 and 2. The PSC required Con Ed to maximize the proceeds of any sale of Indian Point and favored a competitive auction to achieve the highest return. (Jee, Tr. 507-10.)

The first phase of the auction was a preliminary non-binding bid phase in which Con Ed selected bidders for a second, binding bid phase. (Jee, Tr. 512.) Six prospective buyers participated in the first phase of the auction, and of those, Con Ed selected Entergy, Dominion Resources, and AmerGen Energy Company to continue to the second phase of the auction. (Jee, Tr. 512, 617.) In the second phase, Con Ed invited the selected bidders to conduct a more thorough due diligence and then to submit a final, binding bid. (Jee, Tr. 512; CX 357 at 2.) Only Entergy submitted a final binding bid for Indian Point. (CX 414.) In its October 10, 2000 final binding bid, Entergy made two alternative offers to Con Ed: (1) a purchase price of $600 million for the plant and fuel inventory with a power purchase agreement ("PPA") extending from 2001 until 2004; or (2) a purchase price of $502 million for the plant and fuel inventory without a PPA. Id. A PPA would have required Con Ed to purchase power from Entergy for a fixed price during the term of the agreement. (Green, Tr. 2265-66, 2355-57.)

Con Ed represented to bidders during the auction that the Unit 2 spent fuel pool would lose full core discharge capability after 2004. (Jee, Tr. 614; CX 294 at 16.) "Full core discharge capability" means having enough space in the spent fuel pool to store the 193 spent fuel assemblies from the reactor core. (Stip. ¶ 26; Weiss, Tr. 4156.) For Entergy, running out of full core discharge capability "was not a shutdown issue, and it may or may not make refueling operations significantly more difficult . . . ." (Yelverton, Tr. 1708-09.) Instead, the possible lack of full core discharge capability merely became a "planning issue." Id. An Entergy engineer testified that even with a loss of full core discharge capability in a particular year, Entergy believed Unit 2 could operate for two, or possibly three cycles, which amounted to an additional four to six years of operation. (Franklin, Tr. 1465.) Entergy also observed that existing space for spent fuel could be expanded by obtaining credit for dissolved boron in the pool water. (Franklin, Tr. 1463-64.) Con Ed used Boraflex in Unit 2 as a neutron poison in the spent fuel pool racks, but Boraflex degradation had reduced the number of available spaces in the spent fuel pool racks, effectively restricting 166 potential locations at the time of the Indian Point sale. (Franklin, Tr. 1369, 1462-63; CX 366 at 1.) According to Entergy's calculations, with the dissolved boron credit that had been approved for other nuclear plants, Entergy could make available at least half of the restricted locations for storage of spent fuel. (Franklin, Tr. 1463-66.) The record indicates that Entergy was not overly concerned about the potential loss of full core discharge capability, as it had a variety of possible options to address any spent fuel storage issues. (Yelverton, Tr. 1614, 1708-09.) Indeed, full core discharge capacity ultimately was not an issue to Entergy from the time its dry storage facility was approved in 2003. By December 2007, Entergy had built the on-site dry storage facility and had begun loading spent fuel casks on to it. (Franklin, Tr. 1476.) Entergy never had to shut down Unit 2 due to a lack of spent fuel storage space. Id. at 1477.

Con Ed also informed bidders of its investment in Private Fuel Storage ("PFS") and emphasized that PFS could provide a source for storage of Indian Point's future spent fuel. (Jee, Tr. 615; CX 294 at 16.) Significantly, Con Ed's Mr. Jee could not recall any bidders, including Entergy, expressing a concern about DOE's delay in spent fuel acceptance. (Jee, Tr. 629-31.) Mr. Jee admitted that, while responsible for Con Ed's divestiture of the Indian Point plant, he had no first-hand knowledge of any bidder discounting their bid because of DOE's delay. (Jee, Tr. 631.)

By the time of the Indian Point auction, the plant had already undergone a series of extended operational outages. (Jee, Tr. 664.) In June 2001, the NRC placed Indian Point on its regulatory "watch list" due to plant performance deficiencies. (Jee, Tr. 665.) While on the "watch list," the NRC evaluated Indian Point's operational problems. (Yelverton, Tr. 1698.) Con Ed assessed that Indian Point lost $180 million in value by being placed on the NRC "watch list." (Jee, Tr. 671.) Bidders participating in the auction process expressed concern about Indian Point's placement on the NRC "watch list." (Jee, Tr. 665.) In

particular, Entergy considered the regulatory risk to be high because even with "the individuals and talent to be able to control it," the winning bidder would be "really highly scrutinized" and would have to perform well with operational uncertainties. (Yelverton, Tr. 1699-1700; CX 410 at 35-36.)

When the bidders' due diligence process at Indian Point began, Con Ed suffered a "trip-out" in Unit 2 because the steam generator had "developed a large leak that took out the plant." (Jee, Tr. 519-20.) The NRC and PSC would not authorize Con Ed to restart the plant, and consequently Indian Point did not produce any electricity or generate any revenue for nearly one year during the auction process. (Jee, Tr. 620.) Ultimately, Entergy conditioned its purchase of Indian Point on Con Ed replacing the steam generator. The APSA contained a provision covering the steam generator replacement. (Yelverton, Tr. 1677.) By improving Indian Point's poor condition, Entergy believed it could acquire the plant and make it profitable. (Yelverton, Tr. 1673-75.) Because Indian Point had "historically performed poorly," Entergy was confident it could "drastically" improve Indian Point's generating capacity by 20 to 30 percent. (Yelverton, 1663-64; CX 410 at 35.) Also, through the purchase of Indian Point Unit 2, Entergy hoped to create efficiencies with Indian Point Unit 3, which it had purchased in November 2000. By taking "two plants that had broke[n] apart during construction, operated by different entities, and had no interface whatsoever and [were] just as dysfunctional as you could have it" and pull them together, Entergy expected to create "tremendous savings." (Yelverton, Tr. 1673.) During the acquisition process, Entergy was more concerned with the political and environmental risks of operating a nuclear plant near New York City, than with spent fuel issues it had managed successfully elsewhere. (Yelverton, Tr. 1608-09, 1630, 1710-11.) Entergy documented in its investment proposal that "clearly prices of electricity in New York zones" were the most severe risk in the acquisition of Indian Point. (Yelverton, Tr. 1694-95; CX 410 at 35.) Mr. Yelverton, Entergy's former chief executive, explained that trying to figure out "what you could sell your product for in the future" was the biggest risk, because it was a "guessing game" and a slight price change could make a tremendous difference in revenue. (Yelverton, Tr. 1694-95.)

On November 9, 2000, Con Ed and Entergy entered into the APSA for the sale of Indian Point 1 and 2. (CX 426.) Under the APSA, Con Ed agreed to sell the plant to Entergy for $502 million, subject to various adjustments identified in the agreement. (CX 426 at 42-43; Green, Tr. 2266, 2307, 2355-58; CX 370 at 24.) The APSA stated that there would be an increase in the purchase price for the book value of the fuel inventory as of the closing date, which Entergy estimated at $98 million. (CX 426 at 43; CX 410 at 5.) At closing, Entergy paid Con Ed $602 million for Indian Point, reflecting the adjustments listed in the APSA. (Jee, Tr. 593.) Section 2.02(a)(xi) of the APSA specified that Entergy acquired, as part of the "Auctioned Assets:"

> [A]ll claims or causes of action for the refund or return of any payments made or to be made (including any Spent Nuclear Fuel Fees paid or payable) pursuant to the DOE Standard Contract with regard to electricity generated at the Generating Plants and sold on or prior to Closing, but specifically excluding any claims or causes of action in respect of damages to property or economic loss related or pertaining to the Department of Energy's breach or default under the DOE Standard Contract accrued prior to Closing.

(Stip. ¶ 8; CX 426 at 33.) The APSA also stated at Section 2.02(b)(x) that Con Ed retained as part of the "Retained Assets":

> [A]ll claims or causes of action in respect of damages to property or economic loss related or pertaining to the DOE's breach or default under the DOE Standard Contract accrued prior to Closing, but specifically excluding any claims or causes of action for the refund or return of any payments made or to be made (including any Spent Nuclear Fuel Fees paid or payable) pursuant to the DOE Standard Contract with regard to electricity generated at the Generating Plants and sold on or prior to Closing.

(Stip. ¶ 9; CX 426 at 35.) In drafts of the APSA, Entergy insisted upon the inclusion of language limiting Con Ed's retention of claims to those "accrued prior to closing." (CX 460 at 151, 154.) The APSA also obligated Con Ed to transfer $430 million in decommissioning funds to Entergy. (CX 426 at 71.)

1. <u>Entergy's Bid for Indian Point Units 1 and 2</u>

Entergy used a financial model to determine a value for the Indian Point transaction, employing modeling assumptions devised by its due diligence team. (Green, Tr. 2253, 2317-18.) Entergy's valuation model did not include Con Ed's promised transfer of its decommissioning fund providing for post shutdown costs. (Green, Tr. 2345-46.) The results of the valuation process for Indian Point were presented to Entergy's board of directors in an investment proposal. (Green, 2255; CX 410.) The investment proposal contained an "Inventory of Risks" section, describing the risks that Entergy would encounter in acquiring Indian Point and the steps that Entergy could take to mitigate them. (Green, Tr. 2399.) The "most severe risk" to Entergy in deciding whether to purchase Indian Point was "market risk," defined as the risk that the future market price of electricity generated at Indian Point could fluctuate in the years following Entergy's purchase of the plant. (Yelverton, Tr. 1693-95; CX 410 at 35.) Spent fuel storage risks were not specifically identified in Entergy's investment proposal, but to the extent they were considered at all, they were included within

the category of "operational risk." (Green, Tr. 2324-25.) Overall, Entergy considered operational risk to be low. (Green, Tr. 2325.) In the investment proposal, Entergy evaluated risks within its control as "low" or "medium." (Franklin, Tr. 1474.) Believing that it would recover dry storage facility costs from DOE either through settlement or an award of damages, Entergy removed costs associated with a dry storage facility from its valuation model. (Green, Tr. 2285-86, 2323.) Entergy thus assumed that "the costs of dry fuel storage would be recovered from [DOE] as a result of the DOE's failure to begin accepting spent fuel." (CX 525 at 4.) In its calculation of the risk of the Indian Point purchase, Entergy did not include any consideration of costs attributable to DOE's delay in accepting spent nuclear fuel. (Green, Tr. 2093.)

At closing, Entergy paid the $602 million purchase price for Indian Point using its own equity funds. (Green, Tr. 2330-31.) Debt financing was not available for the purchase of plants like Indian Point in 2001, because potential lenders were concerned "that something would happen that would stop production at the plant and, therefore, stop the revenue stream and, therefore, [Entergy would] not have money to make the interest payments." (Green, Tr. 2337.)

2. The Decommissioning Fund

"Decommissioning" is the process by which a nuclear power plant is retired safely from service after being permanently shut down. (Jee, Tr. 526.) The plant's residual radioactivity is reduced to a level that permits release of the property for another use, and the plant's license is terminated. Id. NRC regulations determine the minimum amount needed for decommissioning a nuclear power plant. (Yelverton, Tr. 2199.) These regulations require nuclear licensees to have sufficient funds in a trust account to guarantee performance of plant decommissioning at the end of the license. 10 C.F.R. § 50.75(a) (2008); Jee, Tr. 720-21; Green, Tr. 2338-39. The minimum decommissioning fund is derived either from a plant-specific study or from the generic formula specified by the NRC at 10 C.F.R. § 50.75(b)(4) and (c). The NRC periodically updates its formula to account for various escalation factors, such as changes in labor costs. (Jee, Tr. 721-22, 738-39; Look, Tr. 828.) Under 10 C.F.R. § 50.75, footnote 1, the NRC minimum specifically excludes any costs associated with on-site spent fuel storage. See also Jee, Tr. 632-33; Brewer, Tr. 2884-85. In this case, the NRC minimum was calculated using the NRC's generic formula. 10 C.F.R. § 50.75(c).

Con Ed maintained a trust account set aside for use in the eventual decommissioning of the plant. (Jee, Tr. 526, 720-21.) At the beginning of the Indian Point auction process, Con Ed offered to transfer a decommissioning fund of $314 million to the winning bidder. (Jee, Tr. 633.) Con Ed required approval from the New York PSC for the amount of the decommissioning fund transfer. (Look, Tr. 840.) Con Ed knew that its proposed $314

million decommissioning fund transfer "was on the low side." (DX 500 at 28 (Sternberg Dep., Tr. 148.)) Entergy requested Con Ed to transfer the NRC minimum decommissioning fund as part of the sale. Entergy believed that the NRC would require this amount to approve the license transfer. Anything less than the NRC minimum might result in the license transfer being denied, or granted subject to a condition that additional funding be committed. (Green, Tr. 2342-43.) Con Ed reported to the PSC that all Indian Point bidders wanted the NRC minimum to be transferred as the decommissioning fund, and that the minimum amount was $430 million. (Jee, Tr. 634-35, 662-63.)

At the Indian Point sale closing on September 6, 2001, Con Ed transferred $430 million to Entergy as the decommissioning fund, which the parties believed was the NRC minimum. (Jee, Tr. 637; Green, Tr. 2391; Keuter, Tr. 2777; DX 140.) However, by September 6, 2001, the NRC minimum had increased to $455 million. (Keuter, Tr. 2777.) Entergy proposed to establish a $25 million surety bond or other financial guarantee to cover the increase in the NRC minimum. (Jee, Tr. 717-19; Yelverton, Tr. 2200-01; Collins, Tr. 2426.) Con Ed did not inform Entergy or any of the other potential bidders during the auction process that it was adding money to the decommissioning fund to account for spent nuclear fuel costs. (Look, Tr. 855-56.)

F. Plaintiffs' Mitigation Efforts

When operating Indian Point Unit 2, Con Ed based its spent nuclear fuel management plans upon the need to maintain "full core discharge capability." (CX 163 at 21; Gueron, Tr. 69-70.) "Full core discharge capability" was not a regulatory requirement, but represented Con Ed's policy for purposes of risk management. John Sanchez, a former Con Ed nuclear engineer responsible for spent fuel storage at Indian Point Units 1 and 2, analyzed the annual spent fuel acceptance allocations for Indian Point Unit 2 under the 1987 ACR. He concluded that if DOE had accepted spent fuel at the rates set forth in the 1987 ACR, Unit 2 would not have needed any additional spent fuel storage capacity. (Sanchez, Tr. 307-08, 311; CX 100 at 13.) Mr. William Manion, Con Ed's expert witness, explained that if DOE had performed its spent fuel collection obligations, Con Ed's total spent fuel storage needs never would have exceeded the installed capacity of the Indian Point Unit 2 pool, even allowing for a reserve of cells to maintain full core discharge capability. (Manion, Tr. 5342-44.) Mr. Sanchez concluded that if DOE did not perform as planned in 1998, Indian Point Unit 2 would have lost full core discharge capability by 2005. (Sanchez, Tr. 386; CX 231 at 11.)

To mitigate DOE's breach, Con Ed prepared a report in 1994 entitled "Additional Spent Fuel Storage Evaluation." (CX 162.) This report analyzed Con Ed's alternatives for the long-term storage of spent fuel at Indian Point Unit 2, and recommended that Con Ed pursue the dry storage of spent fuel. Id. Con Ed decided to participate in PFS (known in 1994 as Mescalero Fuel Storage LLC), an initiative formed by a consortium of utilities to

develop a private off-site dry fuel storage facility. (Stip. ¶ 10; Sanchez, Tr. 204-06.) Because Con Ed was concerned about PFS failing due to insufficient financial support, it committed a 10 percent share to this initiative. (Sanchez, Tr. 262-63 ("[W]e did not want to see PFS fail just because one utility demanded only the space it needed, as opposed to bigger ownership.").) Ultimately, Con Ed acquired a 12.5 percent interest in PFS, and expected it to become operational in 2002. (Stip. ¶ 10; Sanchez, Tr. 337-38.) Although PFS was Con Ed's preferred option for spent fuel storage, Con Ed also pursued the development of an on-site dry storage facility as a "back-up option" in case the PFS project encountered delays. (CX 231 at 13; Sanchez, Tr. 284.) Con Ed preferred the PFS off-site storage option because: (1) on-site storage would likely generate vigorous public opposition; (2) building an on-site facility could be challenging due to the Indian Point site's rocky terrain; (3) PFS was a more cost effective option; and (4) a nuclear plant cannot be shut down successfully or decommissioned until all spent fuel is removed. (Quinn, Tr. 460-61; Sanchez, Tr.272; CX 260 at 6; CX 261 at 8.) By 1997, Con Ed was uncertain if the PFS facility would be operational by the time Indian Point lost full core discharge capability. (Sanchez, Tr. 273, 328.) Con Ed planned to build a small dry storage facility as a contingency to maintain full core discharge capability if the PFS project encountered delays. (CX 231 at 13.) Between April 1994 and June 2001, Con Ed made cash payments to PFS totaling $5,942,900. (Stip. ¶ 41.) In 2006, NRC granted PFS's application for an operating license. (Sanchez, Tr. 281-82; Notice of Issuance of Materials License SNM-2513 for PFS, 71 Fed. Reg. 10068 (Feb. 28, 2006).) As part of the Indian Point sale, Con Ed assigned its interest in PFS to Entergy. (Jee, Tr. 589; CX 510; CX 511.) Since acquiring Indian Point Units 1 and 2, Entergy transferred its PFS interest to an Entergy subsidiary, Entergy Nuclear PFS, but continues to participate in the PFS project. (Rives, Tr. 1825-26, 1847-49; CX 511.)

In 2000, Entergy signed a contract with Holtec International, Inc. to supply the HI-STORM system to some of Entergy's nuclear plants utilizing dry fuel storage, including ultimately Indian Point. (Stip. ¶ 30.) By the end of 2007, Entergy had constructed a dry storage facility at Indian Point. The dry storage facility utilizes dry fuel storage casks, composed of metal canisters with concrete and steel casks to store spent fuel. (Stip. ¶ 31.) Until this time, all of the spent fuel at Unit 2 had been stored in the spent fuel pool. (Stip. ¶ 32.) From 1972 to 1974, Indian Point Unit 1 discharged 160 assemblies in spent fuel that remained in the spent fuel pool until 2008. (Stip. ¶ 36, 37.) In August 2008, Entergy loaded 96 spent fuel assemblies from both Units 1 and 2 into dry storage casks. (Stip. ¶ 35, 38.) Therefore, the dry storage facility at Indian Point stores spent fuel from Units 1 and 2, and is designed to eventually hold spent fuel from Unit 3 as well. (Stip. ¶ 38.)

G. Summary of Proceedings

On November 5, 2003, Entergy filed suit in this Court, docketed as No. 03-2622C, alleging partial breach of contract by DOE, breach of the implied covenant of good faith and

fair dealing, and a taking without just compensation. Upon filing, the Entergy case was assigned to Judge Charles F. Lettow. On January 13, 2004, Con Ed filed suit in this Court, docketed as No. 04-33C, making similar allegations against DOE. The Con Ed case originally was assigned to Judge Eric G. Bruggink, but on November 4, 2004, Judge Bruggink transferred the case to Judge Lettow. On March 5, 2005, Judge Lettow granted partial summary judgment on liability for Entergy. Entergy Nuclear Indian Point 2 v. United States, 64 Fed. Cl. 515 (2005). On December 7, 2005, Judge Lettow transferred the Con Ed and Entergy cases to the undersigned. On September 3, 2008, the Court granted Defendant's motion to join Con Ed's and Entergy's claims together for trial and decision. Consol. Edison Co., 83 Fed. Cl. at 459.

Discussion

A. Standards for Decision

The remedy for a partial breach of contract is "damages sufficient to place the injured party in as good a position as it would have been had the breaching party fully performed." Ind. Mich., 422 F.3d at 1373 (citing San Carlos Irrigation & Drainage Dist. v. United States, 111 F.3d 1557, 1562 (Fed. Cir. 1997)). "[T]he non-breaching party should not be placed in a better position through the award of damages than if there had been no breach." Bluebonnet Sav. Bank v. United States, 339 F.3d 1341, 1345 (Fed. Cir. 2003) (citing White v. Delta Constr. Int'l, Inc., 285 F.3d 1040, 1043 (Fed. Cir. 2002.)) Damages must be directly caused by the defendant's breach and not be too remote. See Wells Fargo Bank v. United States, 88 F.3d 1012, 1021 (Fed. Cir. 1996) ("'[R]emote and consequential damages are not recoverable in a common-law suit for breach of contract . . . especially . . . in suits against the United States for the recovery of common-law damages.'") (quoting Northern Helex Co. v. United States, 207 Ct. Cl. 862, 524 F.2d 707, 720 (1975)).

Upon receiving notice that one party to a contract does not intend to perform, the other party is required to mitigate damages, meaning that it must take reasonable efforts to avoid further losses from the breach. Ind. Mich., 422 F.3d at 1375 ("[O]nce a party has reason to know that performance by the other party will not be forthcoming, . . . he is expected to take such affirmative steps as are appropriate in the circumstances to avoid loss by making substitute arrangements or otherwise.") (quoting Restatement (Second) of Contracts §350 cmt. b (1981)); see also Tenn. Valley Auth. v. United States, 69 Fed. Cl. 515, 522-23 (2006). Therefore, if an injured party's efforts to mitigate damages from a breach are reasonable, they are recoverable. See Ind. Mich., 422 F.3d at 1375 ("[W]e see no reason why efforts to avoid damages in contemplation of a partial breach should not also be recoverable."); see also First Heights Bank v. United States, 422 F.3d 1311, 1316-17 (Fed. Cir. 2005) (finding non-breaching party's mitigation efforts to be reasonable). However, "[t]he injured party is not precluded from recovery . . . to the extent that he has made reasonable but unsuccessful

efforts to avoid loss." Restatement (Second) of Contracts § 350(2). "Mitigation is appropriate where a reasonable person, in light of the known facts and circumstances, would have taken steps to avoid damage." Ind. Mich., 422 F.3d at 1375. Mitigation damages are to be awarded to "reimburse a non-breaching party to a contract for the expense it incurred in attempting to rectify the injury the breach caused it." Citizens Fed. Bank v. United States, 474 F.3d 1314, 1320 (Fed. Cir. 2007) (citing Restatement (Second) of Contracts § 347 cmt. c).

A failure to mitigate generally will reduce the award of damages to the non-breaching party. "The amount of loss that [the non-breaching party] could reasonably have avoided by . . . making substitute arrangements or otherwise is simply subtracted from the amount that would otherwise have been recoverable as damages." Restatement (Second) of Contracts § 350(2) cmt. b. In actions before this Court, the Government bears the burden of proving that actions to mitigate were unreasonable. See Tenn. Valley Auth., 69 Fed. Cl. at 528.

"It is beyond debate that because the government unequivocally announced in 1994 that it would not meet its contractual obligations beginning in 1998, the utilities were in fact obligated to take mitigatory steps." Ind. Mich., 422 F.2d at 1375. The Federal Circuit elaborated in a later case:

> This statement, however, does not set 1994 as the earliest possible date for any duty to mitigate. Rather, this passage reveals that this court in Indiana Michigan viewed 1994 as the latest possible date for the utilities' duty to mitigate, not the earliest. The full context of the statement shows this meaning. In the introductory clause ("It is beyond debate"), this court recognizes that no one could reasonably dispute that a duty to mitigate existed in 1994. This statement, however, is not a ruling that the duty to mitigate did not arise until 1994, but instead suggests that the duty could have arisen earlier.

Yankee Atomic Elec. Co., 536 F.3d at 1275. These basic principles will guide the Court in its analysis of the parties' claims and defenses.

B. Elements of Plaintiffs' Burden of Proof

The Plaintiffs in this case present different theories of recovery. Con Ed primarily seeks damages measured by an alleged diminution in value in Indian Point's purchase price. Entergy claims costs incurred to mitigate damages resulting from DOE's breach of the Standard Contract. The same burden of proof principles apply to both theories of recovery.

Con Ed and Entergy must show by a preponderance of the evidence that: "(1) the damages were reasonably foreseeable by the breaching party at the time of contracting; (2) the breach is a substantial causal factor in the damages; and (3) the damages are shown with reasonable certainty." Ind. Mich., 422 F.3d at 1373 (citing Energy Capital Corp. v. United States, 302 F.3d 1314, 1320 (Fed. Cir. 2002)). After plaintiffs have met their three-part burden, "the government bears the burden of showing that [plaintiff's] mitigation efforts were unreasonable." Tenn. Valley Auth., 69 Fed. Cl. at 523. The breaching party thus bears the burden of establishing that plaintiff's damages claims should be reduced or denied. See Home Sav. of Am. v. United States, 399 F.3d 1341, 1353 (Fed. Cir. 2005) (finding that the breaching party did not establish the unreasonableness of a mitigation method).

1. Foreseeability

Damages claimed must be shown to be foreseeable "as a probable result of the breach," meaning that the damages "follow[ed] from the breach (a) in the ordinary course of events, or (b) as a result of special circumstances, beyond the ordinary course of events, that the party in breach had reason to know." Restatement (Second) of Contracts § 351(2). This requirement "reflects the principle that a breaching party should not be liable for the damages that 'it did not at the time of contracting have reason to foresee as a probable result of such a breach.'" Citizens Fed. Bank, 474 F.3d at 1321 (quoting Restatement (Second) of Contracts § 351 cmt. a).

The non-breaching party must demonstrate that both the magnitude and type of damages or injury were foreseeable at the time of contract formation. See Landmark Land Co. v. FDIC, 256 F.3d 1365, 1378 (Fed. Cir. 2001). The non-breaching party need not demonstrate that a particular means of responding to the breach was foreseeable. See Southern Nuclear Operating Co. v. United States, 77 Fed. Cl. 396, 405 (2007), appeal docketed, No. 08-5020 (Fed. Cir. Jan. 3, 2008) ("While the general response to a breach must be foreseen, the particular way that a mitigating decision is implemented need not."). The loss must be more than a "merely remote or possible" consequence of the breach. Old Stone Corp v. United States, 450 F.3d 1360, 1375 (Fed. Cir. 2006) (quoting Nat'l Controls Corp. v. Nat'l Semiconductor Corp., 833 F.2d 491, 496 (3d Cir. 1987)). This Court has found it foreseeable that DOE's non-performance under the Standard Contract would result in nuclear power plants incurring significant storage expenses. See e.g., Sys. Fuels I, 79 Fed. Cl. at 59 (DOE's planning documents cited avoidance of storage costs as a goal for the spent nuclear fuel program from its inception, showing that System Fuels' damages resulting from DOE's non-performance were readily foreseeable.); see also Tenn. Valley Auth., 60 Fed. Cl. at 674 n.10 ("DOE's failure to perform under the Standard Contract thus has led to the very thing the NWPA and the Standard Contract were designed to forestall, *i.e.*, the construction of dry storage facilities for spent nuclear fuel at nuclear power electricity generating plants throughout the United States.").

2. Causation

Causation, like foreseeability, is a question of fact. Bluebonnet Sav. Bank, 266 F.3d at 1356. Causation must be "definitely established," but the breach need not be the sole cause of the damages. Cal. Fed. Bank v. United States, 395 F.3d 1263, 1267-68 (Fed. Cir. 2005). There are two potential standards by which the Court may determine causation: the "but for" test and "the substantial factor" test. In the "but for" test, the breaching party is liable for those damages that it directly and entirely caused. See Citizens Fed. Bank, 474 F.3d at 1318. In the "substantial factor" test, the breaching party is liable for those damages for which the breach was a *substantial* causal factor. Ind. Mich., 422 F.3d at 1373 (emphasis added) (citing Energy Capital Corp., 302 F.3d at 1320). "[T]he selection of an appropriate causation standard depends upon the facts of the particular case and lies largely within the trial court's discretion." Citizens Fed. Bank, 474 F.3d at 1318. Although Indiana Michigan upheld the trial court's application of the "substantial factor" test, in a more recent spent nuclear fuel decision, the Federal Circuit found the more difficult "but for" test to be "preferred" over the "substantial factor" test. Yankee Atomic Elec. Co., 536 F.3d at 1272 ("Although the substantial factor test is not preferred, this court has refrained from reversing trial courts that have applied the substantial factor test . . . "). In evaluating Plaintiffs' claims here, the Court finds that if a claim satisfies neither the "but for" test nor the "substantial factor" test, damages cannot be awarded. For claims that are allowed, the Court finds for the most part that both the "but for" test and the "substantial factor" test have been met. There are only a few "close calls" in this case, which will be identified.

3. Reasonable Certainty

Finally, Plaintiffs can only recover those damages that they can establish with reasonable certainty. Ind. Mich., 422 F.3d at 1373; see also Restatement (Second) of Contracts § 352 cmt. a ("A party cannot recover damages for breach of a contract for loss beyond the amount that the evidence permits to be established with reasonable certainty."). "[W]here responsibility for damages is clear, it is not essential that the amount thereof be ascertainable with absolute exactness or mathematical precision . . . ." San Carlos Irrigation & Drainage Dist., 111 F.3d at 1563 (citing Elec. & Missile Facilities, Inc. v. United States, 189 Ct. Cl. 237, 416 F.2d 1345, 1358 (1969)). A fair and reasonable approximation of damages is sufficient. See, e.g., Energy Capital Corp., 302 F.3d at 1329; Hughes Commc'n Galaxy, Inc. v. United States, 271 F.3d 1060, 1067-68 (Fed. Cir. 2001). Speculative damages, however, cannot be recovered. San Carlos Irrigation & Drainage Dist., 111 F.3d at 1563; see also Ind. Mich., 422 F.3d at 1373.

C. Con Ed's Claims

1. Costs of Studies Relating to Spent Fuel Storage

Con Ed contends that, in an effort to mitigate DOE's breach, it conducted four studies relating to the development and construction of additional spent fuel storage facilities. Con Ed paid Raytheon/Ebasco Division $17,900 to assist in Con Ed's 1994 evaluation of spent fuel storage options in light of DOE's impending breach. (CX 163; Sanchez, Tr 182-83, 195-96; Stip. ¶ 42.) Also in 1994, Con Ed paid Nuclear Energy Services $18,250 to study required upgrades to the Indian Point crane for dry storage and transportation casks to permit spent fuel storage at PFS or at an on-site dry storage facility. (CX 167; Sanchez, Tr. 198-99, 203; Stip. ¶ 45.) In 1999 and 2000, at a cost of $298,000, Con Ed paid Stone & Webster to study the feasibility of constructing an on-site dry storage facility. (CX 319; Stip. ¶ 44.) The following year, Con Ed paid Trivis, Inc. $114,709 to prepare a bid specification for construction of an on-site dry storage facility. (CX 451; Stip. ¶ 43.)

DOE should have foreseen that, if it did not perform under its Standard Contract, Con Ed would be required to evaluate the most efficient ways to self-store spent nuclear fuel, as it did in the Raytheon/Ebasco study. Further, DOE should have foreseen that Con Ed would take steps to evaluate the possible construction of an on-site dry storage facility, the subject of the remaining three studies, to remedy the spent fuel storage problem. Trial testimony confirmed that, had DOE performed under the Standard Contract by accepting spent fuel in 1998, additional spent fuel storage capacity at Indian Point would not have been needed. (Sanchez, Tr. 306-07; Manion, Tr. 5342-43.) Therefore, absent DOE's breach, Con Ed would not have studied alternative methods of spent fuel storage or planned for the building of a dry storage facility. Because Defendant stipulated to Con Ed's four payments to outside vendors for spent fuel storage studies, Con Ed has proven these damages with reasonable certainty. (Stip. ¶¶ 42-45.) The Court, therefore, grants $448,859 in damages to Con Ed for costs incurred in conducting studies to mitigate the effect of DOE's non-performance.

Con Ed also seeks recovery of internal labor costs of two of its former employees, both of whom were responsible for developing additional spent fuel storage options at Indian Point Units 1 and 2 prior to the plant's sale to Entergy. John Sanchez, an engineer, conducted Con Ed's internal spent fuel expansion studies and collaborated with vendors to determine the best methods of addressing Indian Point's spent fuel storage needs. (CX 167; CX 231; CX 319; CX 451; CX 1637; Sanchez, Tr. 182-83, 195-98, 282-83, 285-86, 291-92.) Another engineer, John Skonieczny, was assigned to Con Ed's dry storage project. (Sanchez, Tr. 291-92.) Grace Scarpitta, Con Ed's assistant controller, detailed at trial how Con Ed calculated its internal labor costs resulting from DOE's breach. First, Ms. Scarpitta retrieved the salaries of Mr. Sanchez and Mr. Skonieczny from Con Ed's personnel payroll system. (Scarpitta, Tr. 871-78.) She subtracted overtime and moving expenses to determined their

net salaries. (CX 587 at 9; Scarpitta, Tr. 878-81.) She then calculated the cost of fringe benefits received by the two employees. Con Ed's accounting system does not track fringe benefits by employee but rather generates each year a company-wide "benefit burden," which is expressed as a percentage of an employee's net salary. (Scarpitta, Tr. 881-82, 900.) In 1996, Mr. Sanchez earned $57,761.74 in salary and the benefit burden was 42.49 percent, yielding fringe benefits for that year of $24,542.96. (CX 587 at 9.) Ms. Scarpitta then multiplied each employee's total earnings, consisting of salary and fringe benefits, by the percentage of time each employee claimed to have worked on spent fuel matters. (CX 587 at 9; Scarpitta, Tr. 888-89.) For Mr. Sanchez, Con Ed claims that DOE's breach cost $288,740.88 in salary and $85,487.75 in fringe benefits, for a total of $374,228.63. Id. For Mr. Skonieczny, Con Edison contends that it paid $37,586.90 in salary and $10,958.75 in fringe benefits, for a total of $48,545.65. Id. Adding the two amounts, Con Ed claims it incurred $422,774.27 in internal labor costs caused by DOE's delay.

An injured party can recover the costs of internal labor incurred to mitigate a breach. Carolina Power & Light Co., 82 Fed. Cl. at 47 (2008) (citing Sys. Fuels I, 79 Fed. Cl. at 67); Sys. Fuels, Inc. v. United States, 78 Fed. Cl. 769, 798 (2007) rev'd in part on reconsider., 2010 WL 1005914 at *1 (Fed. Cl. March 11, 2010) ("Sys. Fuels II"); Southern Nuclear Operating Co., 77 Fed. Cl. at 442. However, our Court has required a party to establish with some specificity the number of hours its employees spent on mitigation related projects. See e.g., Sys. Fuels II, 78 Fed Cl. at 769 (disallowing recovery where no records existed regarding employees' time on dry storage project or for other mitigation services); Tenn. Valley Auth., 69 Fed. Cl. at 540 (rejecting claims where plaintiff failed to provide "detailed hours and amounts per employee in its ledger reports"); Dominion Res., Inc. v. United States, 84 Fed. Cl. 259, 283 (2008), appeal docketed, No. 09-5032 (Fed. Cir. Jan. 8, 2009) (rejecting selected labor costs where accounting system did not contain employee hours, amounts or tasks, and "first hand testimony" was not offered). Whether employees dedicated all of their time to mitigation work is unimportant. Sacramento Mun. Util. Dist. v. United States, 293 Fed. Appx. 766, 774 (Fed. Cir. 2008) ("It does not matter if 10 employees dedicated 100 percent of their time or 100 employees dedicated 10 percent of their time to mitigation work."). An injured party can be reimbursed for the total number of hours its employees worked on mitigation projects so long as it can establish that its employees did in fact spend time on those mitigation projects. Id. at 773-74; see also, Wis. Elec. Power Co. v. United States, 90 Fed. Cl. 714, 789 (2009), appeal docketed, No. 10-5088C (Fed. Cir. Feb. 25, 2010) (concluding that the charging of employee hours to dry storage project account numbers established plaintiff's internal labor costs with reasonable certainty).

Con Ed asserts that, in the ordinary course of business, it does not track the amount of time its engineers spend on specific projects. (Sanchez, Tr. 292-93; Scarpitta, Tr. 914-15.) Consequently, Mr. Sanchez did not log the amount of time he spent on dry storage projects. He estimated that he spent approximately 60 percent of his time in 1996 and 1997 on spent

fuel-related projects, and 90 percent of his time between 1998 and 2002. (Sanchez, Tr. 293; CX 587 at 9.) He also recalled that Mr. Skonieczny spent 20 percent of his time between 1999 and 2001 on spent fuel-related studies. (CX 587 at 9; Sanchez, Tr. 296.) Notably, it was Mr. Sanchez, and not Mr. Skonieczny, who vouched for the amount of time that Mr. Skonieczny dedicated to spent fuel storage issues. Id. There are no contemporaneous records maintained by Con Ed to verify the amount of time that either employee spent managing spent fuel projects. In considering damages for spent fuel-related internal labor costs, Defendant argues that the Court would have to rely entirely on Mr. Sanchez's recollection, at least eight years after the fact. (Def.'s Post-Trial Br. at 203.)

The Court agrees with Defendant. Without a project-specific accounting of labor costs or, at a minimum, time sheets recording each employee's activities, Con Ed's estimates simply cannot be confirmed. Con Ed knew that Mr. Sanchez and Mr. Skonieczny would be spending their time in mitigation of DOE's breach, and yet Con Ed apparently did nothing to collect data on the amount of time each employee worked in addressing spent fuel storage issues. Under certain circumstances, an estimate can form the basis for recovery where actual accounting records are not available. See Delco Elec. Corp. v. United States, 17 Cl. Ct. 302, 321 (1989), aff'd, 909 F.2d 1495 (Fed. Cir. 1990) ("Where actual cost data is not available, estimates of the costs may be used," and "should be prepared by competent individuals with adequate knowledge of the facts and circumstances . . . supported with detailed substantiating data. ") (citation omitted). Here, Mr. Sanchez's labor estimates are too rough and imprecise, and cannot possibly establish Con Ed's claimed damages with reasonable certainty. Columbia First Bank v. United States, 60 Fed. Cl. 97, 106 (2004) ("Mere speculation and guess-work are not enough to prove 'reasonable certainty'. . . "). See generally Restatement (Second) of Contracts § 352 ("Damages are not recoverable for loss beyond an amount that the evidence permits to be established with reasonable certainty."). There simply is no contemporaneous evidence to confirm Con Ed's estimates, or any explanation of how the estimates were determined. Bluebonnet Sav. Bank, 266 F.3d at 1355 (finding that evidence adduced must be sufficient to enable the trial court or jury to make a fair and reasonable approximation). Accordingly, Con Ed's claim for internal labor costs is denied.

2. Payments to Private Fuel Storage

Con Ed seeks the recovery of $5,942,900 in damages for its contributions during 1994 through 2001 to PFS, an initiative launched by a consortium of utilities to develop a private off-site dry fuel storage facility. (Stip. ¶ 41.) Con Ed conducted many studies of spent fuel storage options and as part of this exploration, it decided to invest in PFS. (Sanchez, Tr. 204-06.) Mr. Sanchez stated that Con Ed was particularly interested in PFS's off-site spent fuel storage facility after an incident at Northern States Power where "intervenors tried to jump its fence" to protest on-site dry storage outside the plant's spent fuel pool. (Sanchez,

Tr. 450.) In addition, Stephen Quinn, a former Con Ed vice president, encouraged Con Ed's participation in PFS. (Quinn, Tr. 464-65, 475-77.) Mr. Quinn was "intimately involved" with PFS, serving on its board of advisors and attending monthly meetings. Id.

Con Ed asserts that absent DOE's breach, it would not have investigated alternative means for storing spent fuel and therefore its investment in a private, off-site spent fuel storage alternative is recoverable. (Con Ed's Post-Trial Br. at 127.) DOE should have foreseen that its breach of the Standard Contract would require nuclear plant owners to make alternative long-term arrangements for spent fuel storage. Con Ed contends that PFS is one such alternative arrangement and therefore its investment in PFS was a foreseeable consequence of DOE's non-performance. In response, Defendant argues that Con Ed's investment in PFS is not recoverable because PFS was a speculative business venture not foreseeable to DOE in 1983, at the time of signing the Standard Contract. (Def.'s Post-Trial Reply Br. at 69.)

The Court observes that Con Ed's investment in PFS was a prudent mitigation effort to arrange for off-site storage of spent fuel. The rocky terrain on the banks of the Hudson River limited Con Ed's ability to design an on-site storage facility, and the forecast of public opposition to dry spent fuel storage 25 miles from New York City was not unreasonable. Faced with these perceived obstacles in developing an on-site storage facility at Indian Point, Con Ed was wise to explore other storage alternatives. Joining forces with other nuclear plant operators for a relatively modest investment in an off-site facility was a sound strategy.

However, Con Ed transferred its interest in PFS to Entergy in an Assignment Agreement on September 6, 2001. (Sanchez, Tr. 368; Jee, Tr. 589; CX 502.) Con Ed and Entergy agreed on that date as follows:

> *For value received*, the receipt and sufficiency of which is hereby acknowledged upon the execution of this Assignment Agreement by the parties hereto, Seller does hereby assign, transfer and convey its LLC [PFS] Interest to Buyer. Buyer hereby accepts such assignment, and takes such LLC Interest subject to, and hereby assumes, seller's duties and obligations under the LLC Agreement, to the extent of such LLC Interest.

(CX 502 at 1) (emphasis added).

Con Ed contends that it received no money for this assignment, but its witness at trial conceded that Con Ed's interest in PFS had a value of "at least" $6 million. (Sanchez, Tr. 371-72.) Similarly, Entergy had investigated the value of PFS prior to the closing date and

was aware of the amount of Con Ed's investment. (Rives, Tr. 1838, 1845.) At closing, both parties ascribed value to the PFS asset.

The overall Indian Point purchase price of $602 million included Entergy's payment for PFS. (Jee, Tr. 589-90; DX 500 at 5-6.) The fact that the Assignment Agreement lacks a specific price for PFS does not alter this conclusion. By analogy, upon purchasing a new car, the buyer's payment of a lump sum price for the entire vehicle does not mean that the spare tire has no value. Entergy and Con Ed each were able to assess the worth of PFS, and to factor this assessment into the overall price. The PFS asset was a minor detail in the overall transaction, as Con Ed's investment in PFS was less than one percent of the $602 million purchase price. Having been compensated at closing for its investment in PFS, Con Ed should not be paid again by Defendant. See White v. Delta Constr. Int'l, 285 F.3d at 1043 (reiterating a well known contract principle that the non-breaching party should not be placed in a better position than it was before the breach).

The Court also notes that Con Ed decided to transfer the PFS interest to Entergy voluntarily. Just because Con Ed sold Indian Point Units 1 and 2 to Entergy does not mean that Con Ed had to include its PFS interest as part of the sale. Con Ed could have kept the PFS investment for as long as it desired, or it could have offered the PFS interest to any willing buyer at any time, including any of the other PFS investors. The Court does not find it at all plausible that Con Ed would have simply given its PFS interest to Entergy at no charge. The language of the Assignment Agreement, "*for value received,*" refutes Con Ed's position. Accordingly Con Ed's claim for $5,942,900 in costs paid to PFS is denied.

3. Spent Fuel Payments to Decommissioning Fund

Con Ed claims that it added $23 million to the decommissioning fund to account for its share of spent nuclear fuel costs. (Con Ed's Post-Trial Br. at 150.) The theory of this claim is that, due to DOE's breach of the Standard Contract, the buyer of Indian Point Units 1 and 2 would incur additional costs when the nuclear plant ultimately shut down to dispose of spent nuclear fuel stored on the premises. Id. at 160. Con Ed asserts that it contributed these funds to enhance the sale of the nuclear plant to the highest bidder. Id. at 156. Con Ed states that it would not have incurred these costs if DOE had performed under the Standard Contract, because DOE would have collected all of the spent fuel generated during Con Ed's ownership of the plant. Id. at 160.

Despite the surface logic of this claim, Con Ed's position is not supported by the facts. At the closing date of September 6, 2001, Con Ed transferred a decommissioning fund to Entergy of $430 million. Con Ed and Entergy understood that $430 million represented the NRC's minimum decommissioning fund for the Indian Point plant, calculated pursuant to 10 C.F.R. § 50.75. The NRC's regulations provide that spent nuclear fuel costs cannot be

included in a decommissioning fund. 10 C.F.R. § 50.75, n.1. Therefore, the $430 million fund transferred to Entergy could not have included any spent nuclear fuel costs.

As it turned out, the parties were mistaken as to the amount of the NRC minimum at the time of sale. The NRC minimum, from the time of the execution of the APSA to the time of the closing, increased from $430 million to $455 million. (Collins, Tr. 2420-26; Keuter, Tr. 2777; CX 485 at 15-18.) In order to obtain regulatory approval of the transfer, Entergy added the $25 million difference by providing a financial guarantee from its parent corporation. (Collins, Tr. 2426; CX 485 at 16.) Again, there were no spent nuclear fuel costs included in this revised amount.

Moreover, while Con Ed maintains that it added $23 million to the decommissioning fund, there is no evidence that it ever apprised Entergy or any other prospective bidders of this fact. Entergy requested Con Ed only to transfer the NRC minimum, which cannot include any spent fuel costs. The NRC minimum would have been the same regardless of whether DOE had performed the Standard Contract, because spent fuel costs in the fund are zero. If Con Ed transferred $23 million to the decommissioning fund as it claims, the NRC minimum at closing would have been only $407 million, and the amount to be added by Entergy would have been $48 million. The absence of any reference to such numbers in the record undermines Con Ed's claim.

The only evidence that Con Ed sought the addition of $23 million in spent fuel costs to the decommissioning fund occurred at a Con Ed September 11, 2000 presentation to the New York PSC. (Jee, Tr. 675-76, 733-35; CX 401; CX 402.) No representative from Entergy or any other bidder was present at this meeting. (Look, Tr. 841.) The PSC opposed Con Ed's request, wanting to keep the transferred funds as low as possible because the New York ratepayers would receive the funds remaining in Con Ed's decommissioning trust account after the sale. (Jee, Tr. 536; Look, Tr. 860.) Ultimately, however, the PSC approved the transfer of the $430 million NRC minimum to Entergy as part of the sale. (Jee, Tr. 734.)

Thus, the evidence flatly contradicts Con Ed's assertion that it added $23 million to the decommissioning fund for spent fuel costs. Assuming that Con Ed made such a payment to this fund, Con Ed surely would have promoted this fact to prospective buyers as a key point to enhance the sale of the Indian Point plant. Con Ed's failure to notify any bidder of such a payment simply underscores the conclusion that the $430 million NRC minimum fund did not include any amount for spent fuel costs. (Look, Tr. 855-56.) Con Ed's $23 million claim merely is an after-the-fact calculation devoid of any evidentiary support from the Indian Point sales transaction. Con Ed's $23 million claim for allegedly contributing spent fuel costs to the decommissioning fund is denied.

4. Diminished Value of Sales Price

Con Ed alleges that Entergy paid a reduced price for Indian Point Units 1 and 2 due to DOE's breach of the Standard Contract. Con Ed's diminished value claim consists of two parts: (a) that the price was lower because of the perceived risk of spent fuel storage issues ($24,034,827); and (b) that the price was lower due to the unavailability of project debt financing ($64,874,776). These claims are foreclosed by the language of the Asset Purchase and Sale Agreement, and are otherwise not supported by the evidence. As will be shown, the premise for Con Ed's claim is false because Entergy did not reduce its purchase price for any reason having to do with spent fuel storage issues. To the extent the price was not as high as Con Ed would have liked, there are other explanations that are separate and unrelated to DOE's breach.

a. The Asset Purchase and Sale Agreement

Under the plain language of the November 9, 2000 APSA signed by Con Ed and Entergy, Con Ed retained the right to seek reimbursement from DOE only for claims that accrued *prior to* the closing date, and Entergy received the right to bring claims accruing *on or after* the closing date. Consequently, Con Ed relinquished any right to recover damages based upon a reduction of the price paid by Entergy at the time of closing. Entergy received the right to be made whole for all of its post-closing damages caused by DOE's delay. Con Ed only retained claims that existed prior to the closing date of September 6, 2001.

Con Ed prepared the original draft of the APSA, and Entergy submitted various proposed changes to the draft. (Jee, Tr. 688; CX 460.) In particular, Entergy proposed changing the language of the assignment of claims provision in the "Auctioned Assets" section. (Jee, Tr. 688-96; CX 460 at 151.) Con Ed's original draft excluded from this provision those claims against DOE under the Standard Contract "arising or occurring on or prior to the Closing date, whether relating to periods prior to or following the Closing Date." Id. Entergy suggested substituting the terms "accrued prior to" for Con Ed's phrase "arising or occurring on" in the assignment clause, thereby limiting Con Ed's claims against DOE only to those in existence prior to the closing date. Id. The final "Auctioned Assets" provision in the APSA reflects Entergy's changes. (Stip. ¶ 8; Jee, Tr. 696; CX 426 at 33.)

Entergy also proposed, and Con Ed accepted, similar changes to Con Ed's draft of the assignment of claims provision in the "Retained Assets" clause. Con Ed's original draft of that clause had retained for Con Ed those claims against DOE under the Standard Contract "arising or occurring on or prior to the Closing Date, whether relating to periods prior to, on or following the Closing Date." (Jee, Tr. 688-96; CX 460 at 154.) Entergy again struck the phrase "arising or occurring on" and substituted the single term "accrued," once again reducing Con Ed's claims against DOE only to those in existence prior to the closing date.

Id. As Defendant points out, the substitution of the term "accruing" for "arising" is legally significant, as this Court has held that claims can "arise" before they "accrue." See, e.g., Res. Inv., Inc. v. United States, 85 Fed. Cl. 447, 483 (2009) ("[I]t is well-settled that when a regulatory takings claim arises from a permit denial, the taking accrues when a permit is denied").

Further, the Court has explained that a "claim against the United States begins to accrue 'when all the events occurred which fix the liability of the Government and entitle the claimant to institute an action.'" Hyde v. United States, 85 Fed. Cl. 354, 357 (2008) (quoting Kinsey v. United States, 852 F.2d 556, 557 (Fed. Cir. 1988)). Under this definition of claim accrual, Con Ed's diminished value claim can only be considered viable if Con Ed establishes that all of the events needed to fix the liability of DOE occurred prior to the closing date of September 6, 2001. Con Ed argues that DOE's liability was fixed on the date of the APSA's execution because, on that date, Con Ed became contractually obligated to sell Indian Point for a price considerably below the price it would have received in a non-breach world. (Con Ed's Post-Trial Br. at 254.) The parties executed the APSA on November 9, 2000, nearly ten months before the actual closing. (Stip. ¶¶ 5, 6.) During the time between the signing of the APSA and the closing date, the sale was uncertain due to many contingencies beyond the parties' control. (Jee, Tr. 712.) A number of required actions could have delayed or, ultimately foreclosed, the completion of the sale, such as obtaining a license transfer approval from the NRC and the PSC. Id. Without regulatory approval from governmental authorities, the operating license could not have passed from Con Ed to Entergy and the sale would not have been finalized. (CX 674 at 13.) Defendant argues that, because there was no guarantee that the sale would actually be completed until the closing date, Con Ed's diminished value claim is precluded by the APSA.

In addition, Defendant contends that, prior to closing, it was not possible to fix the actual sales price of the Indian Point plant because the APSA only contained an initial baseline price. The parties agreed upon a final price only after months of negotiations. (Jee, Tr. 747; Reed, Tr. 2077.) Until the closing date, without the terms of the sale being finalized, Con Ed cannot claim that all events had been fixed to establish DOE's liability for the diminution in sale value of Indian Point. (Def.'s Post-Trial Br. at 131.) Like Defendant, Entergy also maintains that the legal event constituting potential injury is not the APSA's intent to transfer ownership of Indian Point, but Entergy's payment to Con Ed of the final purchase price at closing. (Entergy's Post-Trial Br. at 97; CX 426 at 42.)

The Court agrees that Con Ed's reduced value claim, if valid, could not have accrued prior to closing because it was not until then that the terms of the sale were finalized and the risk of the transaction's failure eliminated. Con Ed's breach of contract action against DOE did accrue when DOE breached the Standard Contract in 1998, but its later claim for diminution in value only accrued when Con Ed received payment of the purchase price at

closing. See Ind. Mich., 422 F.3d at 1378 ("In the case of the continuing contractual obligations owed after an initial suit for partial breach has been filed, subsequent claims [for future damages are considered to] accrue for the purposes of statute of limitations at the time such damages are incurred."). The APSA's language limiting Con Ed's retained claims to those accrued "*prior* to closing" had the effect of assigning away *all* claims that accrued on or after the sale, including *any* of Con Ed's diminished value claims.

b. Lack of Causation

Even if the plain language of the APSA did not foreclose Con Ed's diminished value claim, Con Ed failed to prove that, in the absence of DOE's delay, it would have received a higher sales price for Indian Point. Con Ed's damages claim must satisfy all three elements of the established test (foreseeability, causation, and reasonable certainty). An adverse finding on any single element will bar Con Ed's recovery. See Ind. Mich., 422 F.3d at 1373. As explained below, the Court finds that Con Ed's diminished value claim fails for lack of causation. Accordingly, the Court does not need to address whether this claim was foreseeable, or whether Con Ed established the claim with reasonable certainty. The analysis below will focus upon the lack of any compelling evidence supporting a causal relationship between DOE's non-performance and a reduction in Indian Point's sales price.

Con Ed's burden is to show that any loss suffered was more than a "merely remote or possible" consequence. Old Stone Corp., 450 F.3d at 1375. Con Ed's expert, Mr. John Reed, conceded that there are no contemporaneous records assessing any diminished value in the Indian Point sales price as a result of DOE's breach. (Reed, Tr. 2210-11.) Mr. Reed calculated Con Ed's reduced value claim approximately seven years after the 2001 sale date. (Reed, Tr. 2211-12.) Mr. Reed based his results on selectively changing the inputs in Entergy's Indian Point valuation model, which served as the foundation for Entergy's bid. Id. Therefore, Con Ed's diminished value claim is dependent upon Mr. Reed's assessment of what Entergy included in its internal valuation model to support the purchase of the Indian Point plant. Mr. Reed provided a similar analysis in another case where the seller of a nuclear plant asserted a diminished value claim. See Boston Edison, 80 Fed. Cl. at 493-95. In that case, the Court rejected Mr. Reed's calculation of diminished value damages finding that "[e]xperience alone cannot substitute for reliable principles . . . and the court has no basis upon which to verify or evaluate the accuracy or legitimacy of Mr. Reed's conclusion." Id. at 495. Here, the Court finds, as in Boston Edison, that Mr. Reed's diminished value calculation lacks any evidentiary support.

Based upon his knowledge of nuclear plant transactions, Mr. Reed asserts that Entergy, along with the entire nuclear industry and financial community, considered spent fuel risk to be significant in 2000 and 2001, at the time of the Indian Point auction process. (CX 674 at 15-22.) Specifically, Mr. Reed stated at trial that "the costs associated with

DOE's failure to accept [spent fuel] on a timely basis represented the single largest unmitigated element of risk in valuing a nuclear plant." (Reed, Tr. 2094-95; CX 674 at 2.) Mr. Reed claims that DOE's delay in spent fuel acceptance reduced Entergy's purchase price for Indian Point by causing Entergy to finance the acquisition through equity rather than a typical mix of debt and equity, and to use a higher discount rate or cost of capital. (CX 674 at 6, 8-9.) Mr. Reed attributed 50 percent of the alleged reduced value damages to these factors. (Reed, Tr. 2067-68.) The Court in Boston Edison discredited Mr. Reed's similar "50 percent" opinion by finding that "Mr. Reed's attempt to assign 50 percent of $72.8 million as Pilgrim's diminution in value due to DOE's breach of the Standard Contract, reflected in a demand for a higher rate of return and lack of debt financing, lacks direct evidentiary support." 80 Fed. Cl. at 495.

Significant holes in Mr. Reed's analysis render it unreliable and not supportive of Con Ed's claim. At trial, Mr. Reed conceded that he could not offer an opinion on how Entergy would have financed the Indian Point acquisition absent DOE's breach, or if Entergy would have been able to obtain debt financing for the plant purchase. (Reed, Tr. 2146-47.) In addition, Mr. Reed did not examine whether Entergy would have required a higher or lower net present value rate for its investment in Indian Point in a non-breach world. Id. Mr. Reed also could not offer an opinion on whether another bidder besides Entergy would have offered a higher purchase price in the absence of DOE's breach. Id. at 2144-45. Critically, Mr. Reed failed to determine how much more Entergy allegedly would have paid for the Indian Point plant if there had been no breach.

Moreover, the evidence at trial established that Entergy never considered the presence of spent fuel at Indian Point to be the "single largest unmitigated element of risk in valuing a nuclear plant," as declared by Mr. Reed. (Reed, Tr. 2094-95; CX 674 at 21-22.) In fact, by the time of the Indian Point transaction, Entergy was well-versed in spent fuel storage issues at nuclear power plants. Entergy owned eight other plants and had already implemented a dry storage solution at its Arkansas Nuclear Plant One. (Rives, Tr. 1790-91, 1827.) Entergy's Mr. Yelverton believed throughout the negotiations with Con Ed that Entergy could resolve on-site spent nuclear fuel storage issues at Indian Point. (Yelverton, Tr. 1686.) According to Mr. Yelverton, the need to construct an on-site dry storage facility at Indian Point "was not a major issue" to Entergy, and he felt confident that Entergy could meet any technical challenges associated with building a dry storage facility at the plant. Id. at 1686, 1763.

Mr. Yelverton prepared a final bid proposal for the acquisition of Indian Point and submitted it to Entergy's board of directors. (Yelverton at 1688-89; CX 410.) This investment proposal contained an "Inventory of Risks" section that highlighted the major concerns relating to the acquisition of Indian Point. (CX 410 at 35-37.) Most troubling to Entergy was the uncertainty of the future market price for electricity in the New York

market. (Yelverton, Tr. 1695-96; CX 410 at 35.) Even Mr. Reed agreed that, in the aggregate, market risk was the most severe concern in the acquisition of Indian Point. (Reed, Tr. 2101.) The second most severe risk to Entergy was Indian Point's regulatory risk given the plant's placement on the NRC's "watch" list, which could lead to additional inspection oversight in the coming years. (CX 410 at 35.) The only other risk not rated as "low" was the possibility of "management issues" at the Indian Point facility.[8] Id. Significantly, Entergy did not separately identify in its investment proposal *any* risk relating to spent fuel storage issues. (Green, Tr. 2325; CX 410 at 35-37.) To Entergy, any risk associated with the presence of spent fuel at Indian Pont was insignificant and could be mitigated by building an on-site dry storage facility.

Entergy expressly assumed in its Indian Point valuation model that it would recover from DOE any spent fuel dry storage costs through litigation or settlement. (Keuter, Tr. 2759-60.) Thus, costs for dry fuel storage were not included in Entergy's Indian Point financial model, effectively removing any impact of DOE's delay from its valuation of the plant. (Green, Tr. 2322-23; CX 293 at 5.) By approving the investment proposal for the Indian Point acquisition, Entergy's board of directors also approved the exclusion of dry fuel storage costs from the financial valuation model and the assumption that such costs would be recovered from DOE. (Green, Tr. 2287-88; Bregar, Tr. 4106-07; CX 410 at 27.)

Although Entergy gave no value to spent fuel storage issues in formulating its Indian Point purchase price, Con Ed insists that the utility industry's recognition of the spent fuel risk created an overall climate of anxiety reducing the plant's sales price. To support this conclusion, Con Ed relies upon an industry survey conducted in 2001 by the Office of Nuclear Energy, a branch of DOE, through a contractor called Scully Capital. (CX 517.) This survey found spent fuel risk to be the most significant risk associated with new power plants. (Paterson, Tr. 1060; CX 517 at 47, 130.) Mr. Andrew Paterson, an independent consultant to Scully Capital, conducted the research for the DOE-commissioned study of the commercial risks of new nuclear plant construction. (CX 517; Paterson, Tr. 1058-60.) In Con Ed's view, Mr. Paterson's research dealing with investment in *new* nuclear power plants also applies to existing plants, such as Indian Point. (Con Ed's Post-Trial Br. at 173.) The Court, however, finds that Mr. Paterson's survey, issued after the closing of the Indian Point sale and concerning only new nuclear plant construction, is irrelevant to the analysis of Entergy's plant risk assessment.

---

[8] The "low" risks identified in Entergy's inventory of risks included: operational risk (related to Indian Point's period of forced outage and historically poor capacity factors); political or local activism; contract risk (relating to the possibility that Con Ed could default on any power purchase agreement entered into with Entergy to mitigate the risk of volatile electricity prices); decommissioning risk (or the risk of an underfunded decommissioning fund); due diligence; and non-nuclear environmental risks. (CX 410 at 35-36.)

In May 2002, Mr. Paterson distributed a written questionnaire to twelve representatives from the nuclear industry. (Paterson, Tr. 1064-65, 1085-86.) Among the participants in the survey were representatives of Entergy, Dominion, and Constellation. (Paterson, Tr. 1102-04; CX 518 at 15.) The survey asked participants to rate the risks associated with new nuclear power plant construction from low (one) to high (five) along two dimensions: probability and impact. (Paterson, Tr. 1069-71.) For each risk, the probability rating and impact rating were multiplied; consequently, the maximum risk rating for a particular risk was 25. (Paterson, Tr. 1070-71.) Mr. Keuter, Entergy's Vice President of Business Development, responded on behalf of Entergy to Mr. Paterson's May 2002 survey and gave the maximum 25.0 severity rating to spent fuel-related risks of new nuclear plant construction. (CX 521 at 19; Paterson, Tr. 1105, 1109-10.) Further, in the survey, the industry and the financial community perceived three risks – waste disposal risk, accident risk, and commissioning risk – to be "show stoppers" for new nuclear plants, meaning risks that would have to be fully addressed in order for a new nuclear plant to be constructed. (CX 517 at 47, 130; Paterson, Tr. 1095-1100.) "Waste disposal" was defined as "risks that costs of disposing of spent fuel and, to a lesser degree, low-level waste will be higher than anticipated." (CX 517 at 47.) Participants found DOE's failure to construct a spent fuel repository at Yucca Mountain to be a "show stopper risk" because "investors were concerned that the return on investment could be curtailed or jeopardized if you had future shutdowns" as a result of spent fuel storage problems. (Paterson, Tr. 1090-91.)

Despite Con Ed's emphasis on Mr. Paterson's study in this case, the scope of the study was limited to risk associated with *new* power plant construction and, therefore, the results should not be applied to Entergy's purchase of the existing Indian Point plant. Mr. Paterson's research does show that there are a "wide variety" of nuclear-specific risks at all nuclear plants but his conclusions on the magnitude of the spent fuel risk are not relevant to existing plants. (George, Tr. 2615-16.) At the time of the Indian Point transaction and Mr. Paterson's survey, the risks associated with spent fuel were greater for new nuclear power plants, largely because the owners of a new plant had not executed the Standard Contract with DOE and, therefore, could not rely upon the prospect of litigation as a means of reducing the risks associated with spent fuel storage. (George, Tr. 2613-15.) DOE was not entering into new contracts with utilities during the time of the Indian Point transaction and did not do so until 2008. (George, Tr. 3376-77.) In 2008, an amendment to the NWPA required that any new nuclear power plant enter into a contract with DOE for the removal of spent fuel. 42 U.S.C. § 10222(b)(1). Mr. George, Defendant's nuclear industry expert, correctly interpreted Mr. Paterson's results to confirm that spent fuel was a lesser risk in existing plants. Mr. George stated:

> If one expects spent nuclear fuel risks to be a much bigger issue for new plants than for existing plants and if the fact that Mr. Paterson's report shows that, even for new plants, this is one of a wide variety of risks, that tends to support my view that it was not a major consideration at the time of the transaction.

(George, Tr. 2616.)

Con Ed's diminished value claim also is undermined by other key facts. The evidence establishes that Con Ed had been operating well below nuclear industry standards at the time of Entergy's acquisition of Indian Point. (Jee, Tr. 664-65.) During due diligence, a tube failure in Unit 2's steam generator resulted in the shutdown of the plant for approximately one year. (Jee, Tr. 620; CX 430.) Entergy believes there were precursors to the steam generator problems that had gone unaddressed by Con Ed and could have been found and corrected. (Yelverton, Tr. 1679). These problems only reinforced Entergy's view that Con Ed had maintained the plant poorly. Id. at 1678. Indian Point's problems continued to plague its sale. An investigation of the steam generator incident resulted in NRC designating Indian Point as an "agency-focus plant" for poor performance, unrelated to spent fuel issues, which Con Ed concluded had caused Indian Point to lose $180 million in value. (Yelverton, Tr. 1697-98; Jee, Tr. 665-70; CX 430; DX 143.) Nuclear plants labeled as "agency focused" receive increased oversight from the NRC and incurred the additional expenses required to remedy the underlying causes for the designation. (Milano, Tr. at 2491-93.) All details regarding Indian Point's steam generator issues and the NRC "watch list" designation were made public. (Milano, Tr. 2484, 2499, 2549-50, 2551-52.)

Before the closing date of the sale, the Indian Point plant was rated as "the most trouble-plagued nuclear plant in the nation" by the NRC. (Jee, Tr. 664-65.) Mr. Jee testified that during the initial bidding process, he received an email from one of Con Ed's in-house attorneys expressing concern about "significant bidder 'risk discount' in light of the current plant situation." (Jee, Tr. 666-67; DX 118.) Con Ed argues that the steam generator leak did not impact Entergy's bid price because the NRC did not release its full assessment of the steam generator shutdown until after Entergy decided on its $602 million final bid. (Con Ed's Post-Trial Br. at 221.) Still, the steam generator problems were important to Entergy. Indian Point remained shut down when Entergy submitted its final bid on October 10, 2000, and Entergy conditioned the purchase of Indian Point on Con Ed's replacement of the steam generators. (Yelverton, Tr. 1677-78.) In addition, one month earlier, Entergy noted Indian Point's other operational issues in its bid proposal to Entergy's board of directors. (CX 410 at 3-4.) Entergy was fully aware of Indian Point's operational issues, even if not their precise scope, when formulating its bid. Entergy incorporated into its valuation model a variety of costs and expenditures associated with projects Entergy would need to perform in order to improve Indian Point's condition and overall performance. Entergy assumed it would need

to spend $25 million in capital costs to improve the condition of Unit 2. (Bregar, Tr. 4097-98; CX 293 at 5.) Even if the $602 million Entergy paid Con Ed for Indian Point was a diminished price, any reduction in value is attributable to the plant's poor operating condition.

5. Unavailability of Project Debt Financing

Based on Mr. Reed's analysis, Con Ed asserts that it suffered damages of $64,874,776 due to Entergy's use of its own equity to pay the Indian Point purchase price at closing on September 6, 2001. (CX 711 at 7.) Con Ed claims that Entergy was unable to obtain project-level debt financing for the Indian Point purchase because spent nuclear fuel concerns prevented the financial community from extending such financing. (Con Ed's Post-Trial Br. at 200.) Con Ed's theory is that Entergy would have offered a higher purchase price if it had obtained project financing instead of using its own equity to pay for the plant. (Con Ed's Post-Trial Br. at 200; Reed, Tr. 2008-10.) This claim is barred by the plain language of the Asset Purchase and Sale Agreement, for the same reasons discussed in subsection (a) of the "Diminished Value of Sales Price" analysis above. The claim also lacks merit due to Con Ed's failure to show any causal link between DOE's breach and the alleged unavailability of debt financing.

Project-level debt financing is a form of third-party project specific debt financing in which the borrowing entity (generally a project entity) is solely responsible for repayment of the loan. (DX 384 at 13, n.14.) Known as non-recourse lending, if the borrowing entity defaults, the lender cannot compel the parent company to repay the loan, but the lender can take control of the project itself. (George, Tr. 2594-95.) For a loan involving a nuclear plant purchase, however, lenders generally do not want to operate a nuclear facility following a default. Id. In fact, although lenders are reluctant to assume responsibility for operating any power plant, project debt financing of nuclear plant purchases posed additional risks. The unique regulatory and licensing issues associated with taking possession of a nuclear power plant raised particular concerns for lenders. (Green, Tr. 2590.) Defendant's nuclear industry expert, Dr. George, testified that a project-level loan could be structured to allow for a parental guarantee should the project default, but that such an arrangement is not typical of project finance. (George, Tr. 2596.) In contrast, corporate-level financing consists of borrowed funds raised by a parent company that can be used for any purpose specified, including the purchase of a nuclear power plant. Corporate-level financing, however, obligates the parent company to repay the loan regardless of the performance of the nuclear power plant. (George, Tr. 2588-89, 2608.)

Whether or not financial markets were willing to issue project-level financing for Entergy's Indian Point purchase, past examples indicate that corporate-level debt has been available to fund nuclear plant acquisitions and presumably could have been used by Entergy

here. For example, financial institutions loaned funds to Constellation to purchase the Nine Mile Point nuclear plant in New York. (Denton, Tr. 1024-25.) Further, both Dominion and Constellation, two other prospective bidders in the Indian Point sale, assumed they would be able to obtain financing for the purchase. (Denton, Tr. 1021-22; Benton, Tr. 1314.) However, Entergy rejected project-level debt financing, and did not desire the more available corporate debt financing for the Indian Point purchase. (Green, Tr. 2331; CX 410 at 14.) Entergy was concerned that using corporate debt financing for its purchase of Indian Point Unit 2 would adversely affect the parent corporation's credit rating. (CX 410 at 33-34; Green, Tr. 2267-68.) Instead, Entergy sought project-level debt financing for its nuclear plant acquisitions, including Indian Point, because it is cheaper than equity and does not impair the parent corporation's credit rating. In its Indian Point investment proposal to the board, Entergy performed a valuation scenario to quantify the impact on its net present value of using 30 percent debt financing, rather than 100 percent equity. Entergy determined that using 30 percent debt financing would increase the value of the plant by $69.2 million, while maintaining the desired rate of return. (CX 410 at 18; Green, Tr. 2379-81.) In addition, at the time of the Indian Point Unit 1 and 2 auction, Entergy attempted to obtain project debt financing for its acquisition of Indian Point Unit 3, as well as two other nuclear plants. (Green, Tr. 2331-32; 2370.) Mr. Green testified that Entergy sought project debt financing from Japanese and Korean banks "because those countries, at the time, had a greater affinity for or tolerance for nuclear power." (Green, Tr. 2370-71.) Entergy's efforts, however, were not successful. Project financing for nuclear power plants was simply unavailable at the time of the Indian Point auction because of the unique risks associated with nuclear assets. (Green, Tr. 2334-35; George, Tr. 2591-92.)

Con Ed contends that, because Entergy did not fund its Indian Point purchase using a capital structure of 50 percent project-level debt financing and 50 percent equity (an ideal capital structure according to Mr. Reed) but instead relied on 100 percent equity financing, Entergy offered a lower price for the plant. (Con Ed's Post-Trial Br. at 197-98.) In Con Ed's view, if Entergy had financed its purchase of Indian Point using debt, it would have increased Entergy's valuation of the plant because using more debt would reduce the discount rate, which would cause the present value of the cash flows of the asset to increase. (Con Ed's Post-Trial Br. at 195.) With project-level debt financing, Con Ed argues that Entergy could also pay a higher purchase price and still maintain its desired return. To succeed on this claim, Con Ed must establish that the financial community's concerns about spent fuel storage issues contributed significantly to the lack of project finance for Entergy's Indian Point acquisition.

This Con Ed claim is so speculative and unsupported that it requires little further analysis. Con Ed did not present any witnesses from a financial lender to support its claim. Entergy established beyond doubt that spent fuel storage issues had no impact on its price to acquire the Indian Point plant. Mr. Green of Entergy's due diligence team testified that

in his efforts to obtain project level financing for Entergy's nuclear plant acquisitions, lenders never expressed an unwillingness to invest because of DOE's breach. (Green, Tr. 2337.) Dr. George, Defendant's expert, also posits that since the risks associated with spent fuel were mitigated by Entergy's extensive experience with dry storage technology by the time of its Indian Point purchase, DOE's delay in spent fuel acceptance did not affect the availability of project-level financing for the transaction. (George, Tr. 2608-11.) Dr. George emphasized that spent fuel issues, although not completely irrelevant to the financial community's lending decisions, did not significantly impact the unavailability of project-level financing. Id. at 2608-09. At the time of the Indian Point sale in 2001, lenders were primarily concerned about significant unexpected events, such as a power plant closure lasting longer than one year that might interrupt cash flows. (George, Tr. 2606-07.) In 2001, despite increases in plant reliability, concerns still existed that unplanned outages might occur. Financial institutions worried that a prolonged shutdown could trigger default and thereby leave a bank with the option of either taking over the plant or losing its investment. (George, Tr. 2606-07; Green, Tr. 2334-35.) The deregulation of the energy markets in the 1990s, which created a competitive market and led to electricity price fluctuations, also heightened concerns for the financial community about providing non-recourse lending. (George, Tr. 2599-2602.)

Although Entergy was unable to use project-level debt financing to purchase Indian Point, the Court concludes that Entergy's decision to use its own equity to pay for Indian Point had nothing to do with DOE's breach. Mr. Reed failed to offer an opinion on whether Entergy would have been able to obtain project-level debt financing in the absence of DOE's delay, or even more generally, how Entergy would have financed its Indian Point purchase if DOE had not breached. Too many other nuclear industry factors and risks, beyond the spent fuel storage risk created by DOE, accounted for Entergy's all equity payment of the Indian Point sales price. There is no basis to Con Ed's position. See San Carlos Irrigation & Drainage Dist., 111 F.3d at 1563 (concluding that damages alleged were too speculative to create contract liability on the part of the Government); see also Ind. Mich., 422 F.3d at 1373.

6. Over-funding of the Decommissioning Fund

Con Ed's expert, Mr. Reed, further opined that DOE's breach caused Entergy to receive less in the decommissioning trust fund than required by the NRC, and that Entergy thereby reduced its purchase price by approximately $18.7 million. As with the other diminished value claims in this case, Con Ed offers only Mr. Reed's speculative conclusions to support its claim that, to compensate for DOE's breach, Con Ed "overfunded" the decommissioning fund by $23 million and thereby caused Entergy to lower its proposed purchase price. This claim is premised upon the assumption that Con Ed contributed an extra $23 million to the decommissioning fund as a result of DOE's breach, a conclusion that the

Court already has rejected. There simply is no evidence that Con Ed made this $23 million contribution, or that Entergy made any adjustment to its purchase price based upon the value of the decommissioning fund. At all times during the auction process, Entergy wanted Con Ed to transfer the NRC minimum, and this is exactly what happened. Entergy never intended to "make money off of decommissioning funds." (Yelverton, Tr. 1738-39.) This Con Ed claim is rejected as being speculative and unsupported.

In summary, of Con Ed's total claims of $137,489,087, the Court awards $448,859.

D. Entergy's Claims

Entergy's damages claims through August 31, 2008, before any adjustment for costs of capital, total $136,811,374. Defendant does not challenge $89,388,884 of Entergy's claims, and thus the contested amount is $47,422,490. (DDX 6 at 5.)

A significant portion of Entergy's claims relates to the construction and operation of an on-site dry spent fuel storage facility at Indian Point Unit 2. Entergy alleges that, absent DOE's breach, it would not have built a dry fuel storage facility at Unit 2, or made any modifications at Units 1 and 2 to accommodate on-site fuel storage. (Schwartz, Tr. 3452-53.) Entergy's decision to build a dry storage facility was in direct response to DOE's breach. When DOE failed to collect spent fuel as called for under the Standard Contract, Entergy was required to store the fuel on-site for an indefinite time. See Tenn. Valley Auth., 69 Fed. Cl. at 520-21. Under well established damages principles, Entergy, as the non-breaching party, had a duty to mitigate losses that could be avoided by "reasonable efforts." Robinson v. United States, 305 F.3d 1330, 1333 (Fed. Cir. 2002) (citing Restatement (Second) of Contracts § 350 cmt. b). After Entergy establishes the foreseeability, causation, and reasonable certainty of its mitigation damages, the Government may attempt to reduce the damage award by showing either that Entergy did not undertake reasonable mitigation efforts, or that the efforts they did undertake were unreasonable. Ind. Mich., 422 F.3d at 1375; Sys. Fuels I, 79 Fed. Cl. at 52; Southern Nuclear Operating Co., 77 Fed. Cl. at 402-04.

Defendant concedes that Entergy's construction of the dry fuel storage facility was a proper mitigation of DOE's breach. All of the costs associated with the design, construction, and operation of the dry fuel storage facility constitute allowable damages.[9] The areas of disagreement fall into eighteen discrete categories. In general, Defendant maintains that some of the claimed costs would have been incurred even if DOE had begun

[9] Entergy's costs of constructing an Indian Point dry storage facility include storage for Unit 3 spent fuel, which is the subject of separate litigation before this Court. Entergy Nuclear Fitzpatrick, LLC v. United States, No. 03-2627C (Fed. Cl. compl. filed Nov. 5, 2003). Since the Court's damages award in this case encompasses the costs of the entire dry storage facility, Entergy should not recover the construction costs again in the Entergy Nuclear Fitzpatrick litigation.

to collect spent fuel as required by the Standard Contract. Defendant further asserts that other Entergy costs were not related to DOE's delay, and were not caused by the breach of the Standard Contract. Defendant also objects to certain Entergy overhead costs, which allegedly did not change as a result of DOE's breach. The remaining issues relate to Entergy's investment in PFS costs, the payment of additional NRC fees, and whether a cost of capital element should be added to Entergy's damages.

In determining the amount of the damages award to Entergy, the Court will examine each of Defendant's objections below. The starting point for Entergy's damages is $89,388,884, the amount that Defendant does not contest. These damages will increase to the extent the Court finds Defendant's objections to be unfounded. Because of the Court's allowance of Entergy's claims for the materials overhead "loader," and internal labor charges, appropriate amounts have been added to individual claim items where necessary. A summary of Entergy's damages is provided at the end of this opinion.

1. Sequence of Fuel Shipments

A threshold question is to assess which spent fuel DOE would have collected first from Indian Point, absent DOE's breach. Entergy's claim is premised upon the assumption that, if DOE had begun accepting spent fuel from nuclear plants in 1998, DOE would have removed all of the spent fuel from Indian Point Unit 1 in that year, and that the Unit 1 pools would have been drained shortly thereafter. (EX 44 at 15.) Entergy claims damages for multiple categories of costs that it incurred at Unit 1 as a result of not being able to drain the pools and shut down Unit 1 operations. Defendant opposes Entergy's position based upon Con Ed's statements that it preferred DOE to accept spent fuel from Unit 2 before Unit 1. (Gueron, Tr. 131.) As early as 1987, Con Ed expressed the view to DOE that, even though Con Ed had received spent fuel acceptance allocations in 1998 based upon the discharge of fuel from Unit 1, Con Ed "should have the option to transfer additional Indian Point 2 fuel in the early years in lieu of Indian Point 1 fuel in the first year." (CX 103.)

Under the Standard Contract, DOE's contracting officer requested utilities to submit Delivery Commitment Schedules ("DCSs") beginning in 1992. The contracting officer's instructions permitted utilities to use spent fuel acceptance allocations at any plant that was governed by a single Standard Contract, without regard to which plant had generated the spent fuel forming the basis of the allocation. (Zabransky, Tr. 5189-90; CX 140 at 4.) Beginning in 1992, Con Ed submitted DCSs to DOE requesting the acceptance of fuel at Indian Point for each year in which Con Ed had been granted an allocation. (Zabransky, Tr. 5141-45; EX 32-C-2; EX 32-C-3; EX 32-C-8; EX 32-C-11; EX 32-C-12; EX 32-C-13; EX 32-C-15; EX 32-C-17.) While Con Ed's allocation rights for 1998 and 1999 were based upon the discharge of spent fuel from Unit 1, Con Ed requested that Unit 2 spent fuel should be collected first. Id. However, DCSs are planning documents, and Con Ed reserved the

right in each DCS to amend its preference and select Unit 1 spent fuel for acceptance by DOE in 1998. (EX 32-C-2 ("Therefore, and in accordance with item 7(b) of the instructions, the reference in our response to Indian Point Unit 2 in item 1.1 does not preclude our eventual election of Indian Point 1 fuel for 1998 delivery.").) This reservation reflects Con Ed's understanding that changed circumstances could warrant a change in its selection of fuel to be collected by DOE. In fact, the DCS planning documents could be amended at any time prior to submission of a Final Delivery Schedule. None of Con Ed's stated preferences ever became final, because the parties never agreed to a Final Delivery Schedule.

The Court has serious reservations with Defendant's position, because it is based upon an assumption that Entergy should be bound by the stated preferences of Con Ed. Con Ed's Mr. Gueron, who advocated the priority for Unit 2 spent fuel, cannot speak for Entergy or its fuel management practices. The DCS forms submitted by Con Ed do not accurately reflect Entergy's views on its fuel management practices if DOE had begun performance as promised. The Court does not see how the breaching party, DOE, could limit Entergy's recovery by attempting to bind Entergy to statements made by Con Ed. Entergy's preference to have Unit 1 spent fuel collected first has at least as much rationality as Con Ed's contrary preference for Unit 2, and Entergy should be allowed to show on its own what most likely would have occurred absent DOE's breach. Moreover, Con Ed's stated preferences never became binding, even on Con Ed. The Court will not saddle Entergy with costs that could have been avoided at Unit 1 if DOE had performed the Standard Contract. As a general proposition, subject to further analysis of the specific allegations below, Defendant is responsible for the Unit 1 costs that Entergy would not have incurred absent DOE's breach.

2. <u>Unit 1 Operating & Maintenance Costs</u>

Entergy claims $9,158,553 for Unit 1 operating and maintenance ("O&M") costs for 2002 through 2008. This claim is based upon the premise that, if DOE had commenced performance under the Standard Contract in 1998 as required, all Unit 1 spent fuel would have been collected in 1998, and the Unit 1 spent fuel pools could have been drained in that year. Thereafter, the costs to operate and maintain Unit 1 would have been unnecessary, and Entergy could have avoided those costs after it acquired the Indian Point plant. (Metcalfe, Tr. 4759-60; 5006, 5032-34; Mayer, Tr. 3799; EX 44 at 28.)

As explained above, Entergy was entitled to assume that DOE would collect Unit 1 spent fuel first. Thus, in the non-breach world, the Unit 1 pools could have been closed and drained in 1998. The 1987 ACR provided that, for 1998, DOE would accept 1200 MTU of spent fuel from all nuclear plants. (Supko, Tr. 4548; CX 100 at Appendix A.) There were 160 assemblies, weighing 30.58 MTU, being stored in the Unit 1 spent fuel pools. (EX 48 at 8.) The 1987 ACR and the 2004 APR show that DOE would have collected all of the Indian Point Unit 1 spent fuel in 1998. (Supko, Tr. at 4579; Mayer, Tr. 3799; EDX 19 at 7;

EX 48 at 4-5.) Applying the oldest-fuel-first allocation methodology and assuming the Unit 1 spent fuel would be picked up before the Unit 2 spent fuel, Entergy properly concludes that in the absence of DOE's breach, it would not have incurred O&M costs at Unit 1 after 1998.

Entergy is entitled to its Unit 1 O&M damages for 2004 through 2008 in the amount of $6,745,093, but there is a deficiency in its claim for 2002 and 2003. For those years, Entergy calculated its O&M costs by preparing an estimate based upon O&M costs for 2004 and 2005. Entergy had removed its 2002 and 2003 O&M charges at Unit 1 by journal transfer, and thereby lost the ability to examine the costs in Entergy's accounting system for these years. Entergy was unable to produce these journal transfers. (Peterson, Tr. 5634-37; DDX 6 at 12.) Without any contemporaneous records, Entergy's expert, Mr. Kenneth Metcalfe, estimated the O&M costs for 2002 and 2003 based upon the recorded amounts for 2004 and 2005. Mr. Metcalfe calculated an average for 2004 and 2005, and applied the average for 2002 and 2003. (Metcalfe, Tr. 4765-68; Peterson, Tr. 5635-39; EDX 20 at 54-60.)

In preparing an estimate for 2002 and 2003, Mr. Metcalfe did not compare staffing levels between years, but simply assumed that staffing levels would remain constant during 2002 through 2005. (Metcalfe, Tr. 4767; Peterson, Tr. 5638-39.) Some of Entergy's personnel in the areas of health physics, radioactive waste, and pool chemistry worked at both Units 1 and 2, and in some cases, at Unit 3. (English, Tr. 4034-36; EX 39-B-1.) Entergy did not provide any evidence showing which personnel actually worked at Unit 1. Due to the shortcomings in Entergy's available records, the Court finds Mr. Metcalfe's estimate for 2002 and 2003 Unit 1 O&M costs too uncertain and imprecise. See Columbia First Bank, 60 Fed. Cl. at 106-07. Accordingly, Entergy's claim for 2004 through 2008 of $6,745,093 is granted, but its 2002 and 2003 claim of $2,413,460 is denied.

3. Groundwater Monitoring Error

Entergy included in its damages claim $54,601 in project management costs incurred in 2004 and 2005 for the Unit 1 groundwater monitoring project. Entergy created the "5UNIT1" work order code to capture labor costs associated with this project. The work order code includes $16,063 in 2004 and $38,538 in 2005 for project management costs, but there were no direct costs recorded to this code during 2004 and 2005. (English, Tr. 4042; Peterson, Tr. 5641-42; DDX 6 at 13; EX 33-A.) Entergy's employee, Mr. English, acknowledged that the allocation of project management costs in 2004 and 2005 to a project that had no direct labor charges was in error. (English, Tr. 4044-45.) Accordingly, these costs should be removed from Entergy's claim.

4. Unit 1 North Curtain Drain Project

Defendant challenges Entergy's claim for $863,414 in Unit 1 north curtain drain repair costs. The Court has determined above that, absent the breach, DOE would have collected the Unit 1 spent fuel first, and that the Unit 1 pools could have been drained and closed in 1998. If this had happened, Entergy's costs for the north curtain drain project could have been avoided. Entergy, therefore, asserts that as a result of DOE's breach, the Unit 1 pools leaked for a much longer period than otherwise would have occurred and that, without this additional leakage, no monitoring or repair would have been necessary.

Entergy was aware of the Unit 1 pool leaks prior to its acquisition of Indian Point. (Mayer, Tr. 3820.) After the discovery of a leak at the Unit 2 spent fuel pool in 2005 and a resulting plant-wide groundwater investigation, Entergy discovered that the Unit 1 fuel pools were leaking more extensively than previously believed. (Mayer, Tr. 3782.) When the Unit 1 pool leaks were first identified in the early 1990s, Con Ed implemented containment measures that included the modification of the Unit 1 fuel storage building's curtain drain system. (Mayer, Tr. 3779-80.) Following Entergy's discovery that the Unit 1 pool leakage was bypassing Con Ed's curtain drain system modification, Entergy installed a more rigorous system to reduce the contamination of the groundwater leaking from the spent fuel pools. (Mayer, Tr. 3802-04.) Entergy contends that, if the Unit 1 spent fuel had been removed in 1998, there would have been no reason to upgrade the north curtain drain system. (English, Tr. 3879.)

Entergy has established that DOE's delay in accepting Indian Point's spent fuel on a timely basis is a direct cause of Entergy having to construct a dry storage facility on site. If Entergy had not been required to construct a dry storage facility, it would not have conducted a plant-wide contamination investigation and found that the Unit 1 pools were leaking extensively. In addition, absent DOE's breach, Entergy would not have been required to maintain the Unit 1 spent fuel pools until such time as it could transfer the spent fuel to another storage facility. The ongoing Unit 1 leaks either would not have been discovered or would not have been addressed because, in the non-breach world, the pools would have been drained and closed upon the collection of Unit 1 spent fuel in 1998.

Entergy has met its burden of establishing a causal relationship between the upgrade of the Unit 1 north curtain drain system and DOE's failure to timely collect spent fuel. Defendant's proposed deduction is denied. The Court grants Entergy's claim for $863,414 in costs associated with the Unit 1 north curtain drain repair. With an appropriate addition for the materials loader, the total award for this claim item is $914,945.

5. Removal of Diesel Tanks

Entergy claims $203,758 as the costs of removing four abandoned diesel fuel tanks in the vicinity of the dry fuel storage pad. (Brewer, Tr. 5478-83; DX 390 at 3.) Entergy discovered the four underground diesel tanks outside of the plant's protected area, due to the construction of the dry storage facility. (Brewer, Tr. 5564; Skonieczny, Tr. 3698-99.) Defendant argues that DOE's non-performance is unrelated to the costs Entergy incurred to remove the abandoned tanks, because Entergy likely would have discovered the tanks during decommissioning even if it had not constructed a dry storage facility. (Brewer, Tr. 5478-83; DX 390 at 31.) Decommissioning work, however, focuses primarily on the protected area. (Skonieczny, Tr. 3688-89.) Defendant's assumption that the abandoned tanks would have been discovered and removed during decommissioning is speculative. The Court finds Entergy's position much more persuasive. (Entergy's Post-Trial Br. at 153.) The diesel tanks were located in a wooded area and beneath two feet of cover. (Brewer, Tr. 5566; Skonieczny, Tr. 3684-85.) A search of the plant's drawings did not reveal the existence of the tanks. (Skonieczny, Tr. 3685.)

As the Court has previously held, the decision by nuclear power plant owners to construct a dry storage facility to store large quantities of spent fuel for an indefinite period is reasonable. See, e.g., Energy Northwest v. United States, 91 Fed. Cl. 531, 546 (2010); Dominion Res., Inc., 84 Fed. Cl. at 273. Entergy's dry storage mitigation expenses likewise are reasonable. Entergy's removal of the abandoned diesel tanks essentially was a dry storage construction expense and does not need to be considered separately. Absent DOE's breach, a dry storage facility would not have been necessary, and Entergy would not have discovered the abandoned diesel tanks. However, following DOE's non-performance, Entergy chose to mitigate damages by constructing a dry storage facility, which led Entergy to find the diesel tanks. (Skonieczny, Tr. 3699-3700.) The causal link here is not too attenuated. See Sys. Fuels II, 78 Fed. Cl. at 795 (finding that, to meet the substantial causal factor test, plaintiff must definitely establish a causal connection, showing that the modification costs flowed "inevitably and naturally" from DOE's breach); Franconia Assoc. v. United States, 61 Fed. Cl. 718, 750 (2004) ("[P]laintiffs need not show that each dollar claimed was entirely unaffected by outside events."). Entergy is not required to demonstrate that the Government's breach was the sole cause of its damages. The fact that DOE's non-performance is, at a minimum, a substantial causal factor in Entergy's uncovering of the fuel tanks is sufficient to award Entergy its removal costs. Therefore, Entergy has met its burden and Defendant has failed to establish that this mitigation expense was unreasonable. Defendant's deduction is rejected and Entergy shall be awarded the diesel tank removal costs of $203,758. With an appropriate addition of internal labor charges, the total award for this claim item is $209,949.

6. Disposal of Radioactive Waste

Due to the unique features of the Holtec dry cask storage system, Entergy was required to make significant modifications to the Unit 2 fuel storage building. Among other changes, Entergy had to upgrade the crane system to accommodate the weight of the Holtec casks. (Schwartz, Tr. 3523.) Entergy incurred costs for an engineering study of the existing Unit 2 overhead crane's weight capacity. (Schwartz, Tr. 3522; EDX 17 at 1.) During this engineering phase, Entergy found that the cost would have been prohibitive to make the existing Unit 2 crane capable of supporting the Holtec cask system. (Schwartz, Tr. 3524-25.) The existing crane could only support a weight of 40 tons, while the loaded Holtec cask could weigh as much as 105 tons. Id. Entergy elected instead to purchase and install a new gantry crane at Unit 2. (Schwartz, Tr. 3532, 3534.)

The gantry crane installation required modification to the floor of the Unit 2 fuel storage building loading bay due to the weight of the crane. (Schwartz, Tr. 3535.) Entergy had to remove the existing loading bay floor, as well as 27 feet of rock and soil, in order to lay a concrete and steel foundation. Id. In performing this work, Entergy discovered and corrected certain below-grade problems. (Schwartz, Tr. 3539-40.) Upon removal of the loading bay floor and the material below it, Entergy found that the floor and the alleyway had been radiologically contaminated from prior plant operations. (Skonieczny, Tr. 3694-95; Brewer, Tr. 5483-84; DX 390 at 32.)

The Government asserts a deduction for the disposal of the radioactive waste from the Unit 2 loading bay floor and alleyway because it contends these activities were unrelated to DOE's breach. (Brewer, 5484; DDX 5.) Although the dry fuel storage project was not the cause of the contamination, the Unit 2 fuel storage building modifications caused Entergy to dispose of the radioactive material. Entergy undertook reasonable mitigation efforts to install the gantry crane, and to remove the existing loading bay floor. Absent DOE's breach, the disposal of the contaminated material would not have been required. It is no answer to say that Entergy would have incurred these same costs at decommissioning. Entergy performed this work for the Unit 2 modifications in a piecemeal fashion, at a much higher cost than would be expected at decommissioning. (Skonieczny, Tr. 3692-93 ("Depending on when the decommissioning started, it's quite possible that the activity in the floor would have been essentially gone, and we could dispose of it as normal material.").) Entergy is entitled to its costs for this activity, in the amount of $674,095. With the addition of internal labor charges, the total award for this claim item is $702,638.

7. Purchase of Debris Canisters and Sludge Clean-up – Unit 1 Spent Fuel Pools

Defendant argues for a $315,000 deduction from Entergy's claim for the costs of removing debris and sludge before draining the Unit 1 pools. Defendant maintains that Entergy would have incurred these costs in the absence of DOE's breach. Whenever Entergy elected to drain the Unit 1 pools, whether at decommissioning or earlier, it needed to clean the pools of debris and sludge before conducting inspections of the spent fuel assemblies, baskets, and racks. (Brewer, Tr. 5484-85; Mayer, Tr. 3812-13.) As part of this cleaning activity, Entergy purchased canisters to package all of the debris remaining in the pools before draining the water and removing the sludge. (Brewer, Tr. 5484-85; DX 390 at 32.) Defendant asserts that, in the non-breach world, Entergy would have been required to purchase such canisters to clean the Unit 1 pools of debris prior to shutdown. (Brewer, Tr. 5484-85; DX 390 at 32.) Indeed, Entergy acknowledges that DOE's delay in spent fuel acceptance was not the cause of Entergy's work relating to the canisters and processing of pool waste. (English, Tr. 4004-05; EX 23-O.) Entergy also hired WMG, Inc. to develop a work plan for the management of the sludge that had accumulated in the Unit 1 spent fuel pools. Again, Entergy admits it would have needed to remove this sludge to drain the Unit 1 pools even if DOE had performed under the Standard Contract. (English, Tr 4008-12; EX-41-P.) The Unit 1 spent fuel pools are now emptied. Entergy is unlikely to incur these sludge and debris removal costs again, even when DOE performs. The Unit 1 spent fuel most likely will be transferred from the dry storage facility directly to DOE. Therefore, Entergy cannot recover one-time costs that it concedes would have been incurred absent DOE's breach. Defendant's objection to this claim item is sustained.

8. Unit 1 Stabilization for SAFSTOR

Defendant alleges that Entergy's Unit 1 SAFSTOR projects were unrelated to DOE's breach, and would have been incurred even if DOE had performed under the Standard Contract. "SAFSTOR" is a term describing the status of an inactive plant between the end of operations and plant decommissioning. (Brewer, Tr. 5485-88; DX 390 at 32-33.) Defendant requests the Court not to include any SAFSTOR costs in Entergy's damages award. Pursuant to the NRC's SAFSTOR regulations, the owner of a nuclear power plant must stabilize and maintain the plant's systems and buildings to minimize any risk of radiological releases. (Mayer, Tr. 3807.) Despite the removal of Unit 1 spent fuel and the completion of pool drainage in 2008, Entergy continues to maintain certain systems and buildings at Unit 1 in compliance with SAFSTOR regulations, including "some level of operator rounds, health physics oversight, and equipment maintenance." Id. Entergy will perform these activities until it elects or is required to decommission Unit 1. Id. at 3809. Entergy's claim includes SAFSTOR costs such as Unit 1 containment exhaust fan work, the seal-up of the containment spray line, containment spray sump grouting, and vessel and tank

content removal. (Brewer, Tr. 5486; DX 390 at 32-33.) When Entergy acquired Indian Point in 2001, there were already a number of areas relating to the radiological and industrial safety of Unit 1 that needed improvement. (Mayer, Tr. 3810.) Entergy has included the costs of these improvements in its claim as well.

The record does not support Entergy's claim that the Unit 1 SAFSTOR stabilization costs were caused by DOE's delayed collection of spent fuel. Following the transfer of the Unit 1 spent fuel from the pools to dry storage, Entergy was no longer required to maintain Unit 1. However, Entergy has chosen to delay the decommissioning of Unit 1 so it can be decommissioned at the same time as Units 2 and 3. (Brewer, Tr. 5484-88; DX 390 at 32.) Entergy thus made a business decision unrelated to DOE's breach to keep Unit 1 in SAFSTOR condition and delay its decommissioning. Defendant is not responsible for this business decision. The Court therefore denies Entergy's claim for its SAFSTOR costs.

9. Site Characterization of Groundwater

Before 1998, the Unit 1 spent fuel pools had been leaking water containing radioactive material. In 1990, Con Ed discovered a small tear in the Unit 2 stainless steel liner and two years later, it was repaired. (Skonieczny, Tr. 3663.) Con Ed cleaned up the contamination, which had spread to the pool's outer wall, and remediated the surrounding soil. (Hinrichs, Tr. 4283.) When Entergy performed Unit 2 plant modifications to load Holtec casks for transfer to the dry storage facility, Entergy discovered that the leaks had not been contained as previously believed. (Mayer, Tr. 3782; Hinrichs, Tr. 4284.) During excavation of the Unit 2 building floor for installation of the gantry crane in 2005, Entergy discovered a hairline crack in the outer wall of the pool 20 feet below the existing floor level. (Skonieczny, Tr. 3656.) Entergy claims that it would not have discovered this leak absent the need to excavate and install the foundation for the gantry crane. (Skonieczny, Tr. 3676.) To contain this leak, Entergy installed a stainless steel box next to the wall to collect the water. Entergy vented the water from the box to the top of a 95-foot wall, and sampled the collected water. (Skonieczny, Tr. 3659.)

Entergy also discovered that the Unit 1 pools were leaking more extensively than initially believed. (Mayer, Tr. 3782.) Con Ed discovered Unit 1 pool leaks in the early 1990s and modified the Unit 1 curtain drain system to contain the leaking water. (Mayer, Tr. 3822-23.) Excessive rain would cause the curtain drain system to overflow, and the rainwater was routed back to the Unit 1 pools, damaging the pool resin beds. (Mayer, Tr. 3780-81.) Entergy contends that if DOE had collected the spent fuel from the Unit 1 pools in 1998, the pools would have been drained and the curtain drain system would no longer have been needed. (English, 4061.) Entergy concludes that it would not have incurred additional expense to mitigate the impact of the rainwater. Id.

As a result of the leaks at Units 1 and 2, Entergy determined that a characterization of the Indian Point site needed to be performed. "Site characterization" is the process by which contamination is identified, quantified, and the migration of the contamination is measured. (Brewer, Tr. 5461; DX 390 at 36.) Entergy's site characterization process included: (1) activities to characterize and monitor the radiological contamination of the Indian Point site arising from leaks in both the Unit 1 and Unit 2 pools; and (2) modifications Entergy performed to the Unit 1 curtain drain system. (Brewer, Tr. 5461-62; DX 390 at 39.) To assess the extent of the pool leaks, Entergy reviewed records relating to the Indian Point site, drilled wells to monitor and take samples to analyze the groundwater, and prepared reports detailing the extent of the contamination. (Brewer, Tr. 5461-62.) Entergy contends that the expense of controlling the leaks was caused by DOE's breach.

The Court does not agree with Entergy's contention. The Indian Point pool leaks were not caused by DOE's partial breach of the Standard Contract. Con Ed and Entergy, as Indian Point's owners, thought they had contained the leaks and could defer any further treatment of them until the time of decommissioning. When Entergy happened to discover in 2005 in connection with Unit 2 plant modifications that the leaks were not being contained, Entergy decided that site characterization work could not wait and needed to be performed immediately. The leaks essentially were plant operation issues unrelated to DOE's breach, and part of Con Ed's and Entergy's obligation to maintain the plant in good order. The only connection to DOE's breach is that the site characterization work had to be accelerated to load casks for Entergy's dry storage facility.

Even if some causal relation to DOE's breach existed, the site characterization of groundwater is a decommissioning cost that Entergy would have performed anyway at plant shutdown. The Court cannot hold DOE responsible for the operational shortcomings of Con Ed and Entergy in allowing thousands of gallons of contaminated water to flow into the environment. The owners of Indian Point were obligated to correct these spent fuel pool leaks regardless of DOE's breach. By performing the site characterization work as it did, Entergy will not be required to do it again at decommissioning.

10. <u>Damaged Fuel Canisters</u>

Defendant argues for a deduction of $1,681,807 from Entergy's damages award for the costs of Entergy's placement of Unit 1 fuel assemblies in damaged fuel canisters, claiming that Entergy would have incurred these costs absent DOE's breach. "Damaged fuel" refers to a fuel assembly with a flawed or cracked outer seal, called "cladding," where small pieces of radioactive fuel pellets can escape from the assembly. (Schwartz, Tr. 3644.) With the Holtec dry cask system, if a fuel assembly is found to be leaking, damaged fuel rods are removed and replaced with stainless steel slug rods before the fuel assembly could be loaded into the Holtec canister. (Weiss, Tr. 4144.)

According to historical data showing the chemical analysis of Unit 1 spent fuel, every nuclear fuel cycle at the plant had produced one or more leaking fuel rods. (Weiss, Tr. 4145-46.) Entergy could not determine the nature or severity of the fuel rod leaks without conducting extensive further analysis. (Weiss, Tr. 4146.) Entergy decided for reasons of cost and schedule efficiency to place all Unit 1 spent fuel assemblies in damaged fuel canisters, thus avoiding the cost of the significant testing of each assembly. (Mayer, Tr. 3770-71; English, Tr. 3961-62; Weiss, Tr. 4153.)

There is no reliable way to know whether Entergy would have incurred these damaged container costs if DOE had performed. The type of cask that DOE would have employed absent the breach is unknown. (English, Tr. 4066-67; Weiss, Tr. 4148.) The record does not indicate whether Entergy would have performed testing for damaged fuel assemblies, or even used damaged fuel canisters. The Court cannot say short of speculation how the procedures Entergy actually employed would compare to the procedures that DOE would have required. No DOE cask descriptions or loading procedures exist. (Janicki, Tr. 4199.) The Court does not know if the Holtec canisters will be compatible with DOE-provided casks. Accordingly, with the addition of appropriate materials loader and internal labor charges, the Court awards Entergy $1,785,792 as its costs of loading Unit 1 spent fuel into damaged fuel canisters.

11. Loading Activities

Defendant asserts that the Court should deduct from Entergy's claim $1,272,760 in costs for the development of procedures and training of personnel for cask loading activities at Units 1 and 2. Defendant argues that the same loading expenses would have been incurred absent DOE's breach. (Peterson, Tr. 5683-84; DX 391 at 189-212; DDX 6 at 39-40.) Before Entergy could engage in the dry cask loading process, Entergy had to form a dry cask storage team, develop specific cask loading procedures for the Holtec casks, prepare a formal training program, train the employees, conduct internal practice runs, and perform dry runs for NRC officials. (Janicki, Tr. 4185-89.) In addition, the NRC requires site-specific procedures, necessitating the development of two sets of procedures for operating and maintaining the Holtec system at Indian Point Units 1 and 2. See 10 C.F.R. Part 72. Defendant does not dispute that Entergy developed site-specific procedures for the loading of spent fuel from Units 1 and 2 into the Holtec casks, the chosen cask supplier for Entergy's dry storage facility. (Brewer, Tr. 5520-23; DX 390 at 19-20.) Similarly, Defendant does not deny that Entergy incurred costs to train personnel in loading storage casks at Units 1 and 2. (Brewer, Tr. 5523-24; DX 390 at 19-20.)

The record supports the conclusion that the NRC's required training and loading procedures are specific to the cask system utilized, even if produced by the same manufacturer. (Janicki, Tr. 4190-91.) If DOE had timely commenced spent fuel acceptance, Entergy would have developed a set of procedures to accommodate the loading of spent fuel

into transportation casks provided by DOE. (Schwartz, Tr. 3583-84; Hinrichs, Tr. 4360; Brewer, Tr. 5520-23; DX 390 at 19-21.) Entergy's plant personnel also likely would have been trained in loading the DOE casks and dry runs would have been performed to verify the procedures. These costs most likely would have varied from those incurred by Entergy for dry storage preparation with its own casks. Defendant submits that Entergy's actual costs to develop plant-specific loading procedures for the Holtec cask system, to train its personnel in cask loading, and to perform dry-runs are the best estimate for the costs to execute similar activities in the non-breach world. (Def.'s Post-Trial Br. at 220.) Defendant maintains that, by loading spent fuel into dry storage casks to mitigate DOE's breach, Entergy has now avoided the costs for loading fuel into any cask that DOE may provide in the future.[10] (Brewer, Tr. 5520-23; DX 390 at 19-21.)

The Court uniformly has rejected Defendant's position in previous spent nuclear fuel decisions because "these loading costs have merely been deferred," not avoided. Carolina Power & Light Co., 82 Fed. Cl. at 52; see also Sys. Fuels I, 79 Fed. Cl. at 70-71; Northern States Power Co. v. United States, 78 Fed. Cl. 449, 468-69 (2007), appeal docketed No. 08-5037 (Fed. Cir. Feb. 13, 2008); Pac. Gas & Elec. Co., 73 Fed. Cl. at 416; Sacramento Mun. Util. Dist., 70 Fed. Cl. at 372; Tenn. Valley Auth., 69 Fed. Cl. at 542. There is no reason to deviate from the Court's earlier holdings on this issue. Under the Standard Contract, Entergy remains obligated to pay for loading costs whenever DOE arrives to collect Indian Point's spent fuel in the future. Since DOE has not performed, Entergy has not yet incurred the costs of loading spent fuel from its dry storage facility for transfer to DOE. Yet, Entergy will incur these costs in the future. See Sys. Fuels II, 78 Fed. Cl. at 797 ("[C]ask loading costs are more accurately characterized as deferred costs rather than avoided costs."); Pac. Gas & Elec. Co., 73 Fed. Cl. at 416 (holding that plaintiff's loading costs were deferred and not avoided). Entergy's loading of the spent fuel from Units 1 and 2 on to its on-site dry storage facility is merely a substitute performance to mitigate DOE's delay. The Court sees no reason why Entergy should have to pay twice for the same or similar loading activities. See Carolina Power & Light Co., 82 Fed. Cl. at 52; see also Restatement (Second) of Contracts § 347(c), cmt. d.

Even if these loading costs were avoided and not deferred, Defendant has failed to demonstrate what Entergy's loading costs would have been if DOE had performed. Just as speculative damages cannot be awarded, the Court cannot grant a speculative offset. See Ind.

[10] The Court already has rejected Defendant's argument that the loading activities represented an avoided cost for Entergy. In a June 24, 2009 ruling on the record, the Court stated: "[L]et's not spend any more time trying to determine what the costs of loading a DOE cask would be. That seems to be highly speculative and inappropriate to consider as an offset in any event." (Tr. 4921-22.) The Court's ruling is consistent with the Federal Circuit's recent decision in Carolina Power & Light Co. v. United States denying Defendant's cask-loading offset claim, finding that the nuclear plant had not avoided the costs of loading but had merely deferred them until DOE performed. 573 F.3d 1271, 1277 (Fed. Cir. 2009).

Mich., 422 F.3d at 1373. Accordingly, the Court grants Entergy $1,272,760 as its costs for cask loading activities.

12. Plant Activities

Entergy performed a number of plant activities associated with loading spent fuel from the Unit 1 spent fuel pools and transferring it to the on-site dry storage facility. For the most part, these activities would have been required if DOE had timely accepted spent fuel under the Standard Contract, but they may be required again when DOE performs. In 2008, Entergy removed all 160 spent fuel assemblies from the Unit 1 pools and transferred them to the dry storage facility. (Weiss, Tr. 4135, 4140, 4164.) Defendant seeks a reduction of $2,801,395 from Entergy's damages award for the following Unit 1 pre-loading activities: (1) cleaning the spent fuel assemblies stored in the Unit 1 pools ($1,414,828); (2) refurbishment of fuel handling tools ($88,082); (3) upgrades to the Unit 1 crane ($1,184,310); and (4) repair of the Unit 1 ventilation system to comply with applicable licensing specifications ($114,175). Some of these activities also would have been necessary to load Unit 1 spent fuel into DOE provided-casks if DOE had begun performance under the Standard Contract in 1998.[11] Entergy contends that its Unit 1 plant modifications were far greater than they would have been in 1998 because of the extra decade of on-site storage due to DOE's breach. (Entergy's Post-Trial Br. at 138, n.48; Mayer, Tr. 3815-16.)

After considering the evidence and the parties' positions, the Court will disallow Entergy's $1,414,828 claim for Unit 1 pool clean-up costs, and $114,175 in costs associated with ventilation system repair. These costs were not deferred and would have been incurred absent DOE's breach. The Court will allow $1,272,392 in mitigation costs associated with the refurbishment of hand tools, and the upgrades to the Unit 1 crane, plus appropriate amounts for the materials loader and internal labor charges. The Court will address each of the four Unit 1 plant activity claims below.

a. Unit 1 Clean-up Costs

Defendant seeks a denial of Entergy's Unit 1 pool and fuel assembly clean-up costs, claiming that Entergy would have incurred these costs absent DOE's breach. Before loading the Unit 1 spent fuel assemblies into dry storage casks, Entergy removed the corrosion that had accumulated on the top of the fuel assemblies to improve visibility and maintain water clarity in the pools. (Mayer, Tr. 3812; Brewer, Tr. 5518-19; DX 390 at 31.) The Unit 1 pool

[11] It is true that, absent DOE's breach, at least some of the work relating to Unit 1 spent fuel collection would have been performed by Con Edison, rather than Entergy. However, this distinction is not relevant to the Court's consideration of the award to Entergy of costs associated with Unit 1 loading preparation activities. Entergy, not Con Ed, incurred these Unit 1 costs in mitigation of DOE's breach and in most instances, will incur such costs again when DOE performs.

clarity had deteriorated over time due to the age of the spent fuel assemblies and the accumulation of corrosion. (Mayer, Tr. 3812-13.) Entergy purchased necessary equipment, such as a jet sprayer, underwater cameras, a skimmer system, a pool level indicator, and an additional filtration system to inspect and move the fuel assemblies within the Unit 1 pools. Entergy needed this equipment to move fuel assemblies out of the Unit 1 pools, regardless of the cask system employed. (English, Tr. 3965-67, 3974-78.) Entergy's witness, Mr. Don Mayer, agreed that the need for pool clarity would have existed even if DOE had performed under the Standard Contract as required. (Mayer, Tr. 3813.)

Although Entergy instead of Con Ed incurred the Unit 1pool clean-up costs as a result of DOE's delay, Entergy will not have to incur these costs again when DOE performs. All of the spent fuel assemblies were removed from the Unit 1 pools, and transferred to the dry storage facility. Entergy then drained the Unit 1 pools. Whenever DOE begins accepting Unit 1 spent fuel assemblies, they most likely will be loaded directly from Indian Point's on-site dry storage facility. Consequently, a further clean-up of the Unit 1 spent fuel pools will not be required. The Unit 1 pool clean-up effort was a one-time expense that would have been required even if DOE had begun performance in 1998. (Brewer Tr. 5518-19; DX 390 at 31.) Entergy's pool-clean up costs therefore are not deferred to a later date, but consist of actual costs expended that will not be incurred again. Accordingly, the Court denies Entergy's claim for Unit 1 pool clean-up costs.

b. Refurbishment of Fuel Handling Tools

Defendant also asks the Court to reject Entergy's claim for refurbishment of the Unit 1 fuel handling tools. Moving fuel assemblies requires special handling tools designed to attach to the upper end of the fuel assembly, allowing the assembly to be lifted. (Brewer Tr. 5512-14; DX 390 at 28.) The fuel assemblies cannot be moved without using the special fuel handling tools. (Brewer, Tr. 5509-10, 5512-14; DX 390 at 30.) Entergy refurbished and load-tested the handling tools because they had not been used to move fuel in 30 years. (English, Tr. 3971-74; Brewer, Tr. 5512-14; EX 23Q; DX 390 at 30.) The evidence supports a conclusion that, had DOE performed in 1998, the Unit 1 handling tools would have been refurbished to move the fuel assemblies from their spent fuel storage racks into DOE-provided casks. (Brewer, Tr. 5512-14; DX at 390 at 30.)

However, Entergy likely will incur handling tool costs again in the future when DOE ultimately performs under the Standard Contract. At present, the record does not indicate and the Court could not guess what procedures DOE will employ to remove the Unit 1 spent fuel assemblies from the Indian Point site. Defendant's expert, Mr. Warren Brewer, conceded that Entergy may incur costs in the future to refurbish handling tools when DOE performs under the Standard Contract. (Brewer, Tr. 5545.) Consequently, it would be speculative to say what costs Entergy may incur in the future. It would be equally speculative to say that Entergy will not incur any further handling tool refurbishment costs.

See Pac. Gas & Elec. Co., 73 Fed. Cl. at 416 (holding that given the speculative nature of the future costs, "the court declines to engage in a guessing game as to whether such deferred costs will have increased or decreased by the time (if ever) defendant performs the parties' Standard Contract."). As a result of DOE's breach, Entergy should not be required to pay twice to refurbish the tools needed for Unit 1fuel assembly transfer. The Court will grant Entergy's $88,082 claim for this item, plus an appropriate amount for internal labor charges. The total award for refurbishing handling tools is $91,727.

c. Unit 1 Crane Upgrade

Defendant requests the Court to deny Entergy's $1,184,310 claim for Unit 1 crane upgrade costs, arguing that these costs will not be required again when DOE performs under the Standard Contract. In 2008, after completing construction of the Indian Point dry storage facility, Entergy had to rebuild its Unit 1 crane to handle heavier loads associated with the Holtec cask storage system. This crane had not been used to load spent fuel casks since the early 1970s. Since that time, NRC regulatory changes required Entergy either to "single-failure-proof" the crane, or to perform an engineering load analysis and obtain NRC approval to use the crane for cask loading. (English, Tr. 3945-49; EX 3-M-11; DX 390 at 30.) A "single-failure-proof" capability minimizes the occurrence of accidents during cask loading and transfer operations. See Sys. Fuels I, 79 Fed. Cl. at 60-61. Entergy elected not to single-failure-proof the crane, but performed instead a cask drop analysis and took specific mitigation precautions, including the installation of impact limiters, to obtain NRC approval. (English, Tr. 3950-52.) Entergy maintains that its load drop analysis was unique to the Holtec cask loading system, and may not have been necessary absent DOE's breach. (Brewer, Tr. 5555 ("I agree they [the license amendment costs] could be different. The analysis – the drop analysis would be dependent on the type of cask. Hence, therefore, it could be – the cost of doing that drop analysis could be different.").)

Further, to facilitate the loading of fuel assemblies, Entergy refurbished the Unit 1 crane by cleaning the accumulated grease and grime, performing a structural inspection, changing the electronics, and re-bolting the crane rail on which the crane rides. (English, Tr. 3953-54; Mayer, Tr. 3814.) Once again, the Court cannot guess whether these Unit 1 crane upgrade costs would have been incurred absent DOE's breach, or whether additional crane upgrade costs might be incurred in the future when DOE performs. Most probably, the crane upgrade costs were attributable to the heavier loads of the Holtec cask system, and Entergy employed this dry storage cask system due to DOE's breach. Any reduction of those costs from Entergy's damages award would be purely speculative. Accordingly, the Court grants Entergy's Unit 1 crane upgrade costs of $1,184,310. Adding appropriate amounts for the materials loader and internal labor charges, the total award for this claim item is $1,265,003.

d. Unit 1 Ventilation Repair

Defendant also challenges Entergy's $114,175 claim for ventilation repair costs. The Court denies Entergy's claim for these costs. Pursuant to the NRC's operating license, the Unit 1 ventilation system must be in service and the exhaust monitored for radiation any time that spent fuel assemblies are being handled. (Brewer, Tr. 5514-18; DX 390 at 30-31.) Based upon the evidence, the Court is persuaded that repair of the ventilation system for it to be serviceable during loading activities would have been required even in the absence of DOE's breach. Defendant's expert, Mr. Brewer, confesses that he is unsure if the ventilation system was operable in 1998 when DOE should have performed. (Brewer, Tr. 5540.) Similarly, Entergy cannot say whether the ventilation system would have needed repair in 1998. (English, Tr. 3871.) Therefore, had DOE collected the Unit 1 spent fuel in 1998 or at a later time, the plant owner may have been required to repair the ventilation system. No evidence establishes that DOE's breach was the direct or substantial cause of Entergy's ventilation repair. Accordingly, the Court denies Entergy's claim for ventilation repair costs.

13. Unit 2 Spent Fuel Characterization and Visual Inspection

Entergy incurred $515,855 in costs to characterize, by ultrasonic inspection, the fuel in the Unit 2 pool in order to identify any failed fuel prior to loading the fuel assemblies into its Holtec dry storage casks. (Hinrichs, Tr. 4364-65; Weiss, Tr. 4178.) Spent fuel characterization is defined as the process of documenting the physical and nuclear characteristics of spent fuel assemblies. (DX 390 at 25-26.) All NRC-licensed storage and transportation casks, including any that will be supplied by DOE when it performs, require that such characterization be performed prior to loading. (Brewer, Tr. 5504, 5507.) DOE's Standard Contract requires utilities to submit information about each of the fuel assemblies to be transferred to DOE. (DX 390 at 25.) Absent DOE's breach, the same fuel characterization effort would have been required before loading the fuel assemblies into DOE casks. However, these same efforts may need to be repeated in the future if Entergy is required to unload the fuel assemblies from their casks and re-load them into DOE provided casks. See Dominion Res., Inc., 84 Fed. Cl. at 279 ("We view the fuel characterization costs as conceptually similar to costs for loading fuel. These costs have not been avoided but merely have been deferred until delivery to DOE in the future."). Although it is unclear whether additional fuel characterization will be required when DOE performs, Defendant should bear the burden of this uncertainty, not Entergy. As a result of its reasonable mitigation efforts, Entergy should not be required to pay twice for inspection costs. Entergy thus is awarded $515,855, plus an appropriate amount for internal labor charges. The total award for this claim item is $570,106.

14. Private Fuel Storage Payments

Con Ed transferred its interest in PFS to Entergy on September 6, 2001, the closing date of the Indian Point sale. Entergy continued to make contributions to PFS in the amount of $1,598,200, and it claims this amount as damages, asserting that PFS was a reasonable off-site option for the storage of spent fuel. (Rives, Tr. 1849-50.) However, shortly after acquiring Indian Point Units 1 and 2, Entergy committed to an on-site dry storage facility as its spent fuel solution for DOE's delay in performance. Entergy regarded PFS as a potential off-site storage solution for its entire fleet of nuclear plants, but not for Indian Point specifically. (Rives, Tr. 1846-47; Schwartz, Tr. 3570-72.) In February 2002, Entergy transferred its interest in PFS to a subsidiary, Entergy Nuclear PFS Company, and the subsidiary still holds an interest in PFS. (Rives, Tr. 1847, 1849, 1851; CX 511.) Entergy also was mindful of the profit potential for PFS. (Rives, Tr. 1851; CX 534 at 1.)

Entergy's investment in PFS thus is not a mitigation cost attributable to DOE's breach at Indian Point. Rather, the PFS expense is a venture that Entergy voluntarily undertook after acquiring PFS from Con Ed with a view to Entergy's overall nuclear plant operations. Since Entergy already had decided upon constructing an on-site dry storage facility at Indian Point, the PFS expense was not necessary for storage of Indian Point's spent fuel. Accordingly, Entergy's claim for the recovery of $1,598,200 in PFS costs is denied.

15. NRC Fees

Entergy claims $2,148,901 as damages for having to pay increased NRC fees at Indian Point from 2002 to 2008. The NRC is charged with licensing and regulating the civilian use of nuclear materials to protect the public health, safety, and the environment, and to provide for common defense and security. (Rabideau, Tr. 5206.) Under the 1990 Omnibus Budget Reconciliation Act, the NRC must recover nearly all of its appropriations through fees assessed to its licensees, including nuclear plant licensees. (42 U.S.C. § 2214 (2006); Rabideau, Tr. 5210.) The NRC issues licenses to nuclear plants under 10 C.F.R. Part 50, and also under 10 C.F.R. Part 72 for nuclear plants that have dry storage facilities for spent fuel. (Rabideau, Tr. 5210-11.)

The NRC charges two types of fees to licensees. First, under 10 C.F.R. Part 170, the NRC charges hourly fees for a variety of specific services provided to particular licensees. (Rabideau, Tr. 5212, 5216, 5263-64.) Among the Part 170 fees are NRC costs for reviewing license applications, conducting inspections, and reviewing proposed amendments or requested actions. Id. Second, under 10 C.F.R. Part 171, the NRC assesses annual fees that apply broadly to an entire class of licensees. (Rabideau, Tr. 5213, 5264.) These "generic" fees encompass costs that the NRC incurs through rule-making, research, the development of regulatory guidance, and other safety and environmental activities. Id. at 5213.

Prior to 1999, the NRC recovered the costs it incurred performing wet storage, dry storage, and decommissioning work through Part 171 annual fee assessments to 10 C.F.R. Part 50 licensees with operating nuclear reactors. (Rabideau, Tr. 5214, 5220-22, 5272-73.) The NRC assessed dry storage fees only to those 10 C.F.R. Part 50 licensees that also held a specific Part 72 dry storage facility license. (Rabideau, Tr. 5272-73, 5418; EX 24-F; DX 45.) Under this structure, the costs of NRC's generic dry storage activities were borne solely by those utilities that had already built dry storage facilities. (Rabideau, Tr. 5214, 5221-22, 5272-73; DX 45.) Over time, the NRC began to realize that its Part 171 fees were creating a possible disincentive for utilities to construct dry storage. (DX 45 (NRC Memorandum observing that the assessment of fees "could create a disincentive for licensees to pursue dry storage.").) The fees were being assessed inequitably between utilities that had already constructed dry storage facilities and those that had chosen to maintain only wet storage capability. (Rabideau, Tr. 5259-60, 5290, 5437-38; EX 84; EX 24G at X439.)

In 1999, the NRC modified the Part 171 fee structure. One change was to add an annual spent fuel storage/reactor decommissioning fee ("SFS/RD fee") to address the NRC's costs to perform industry-wide activities associated with the wet and dry storage of spent fuel, as well as the decommissioning of nuclear plants. (Rabideau, Tr. 5214, 5220-21, 5272-73; EX 84.) The NRC currently charges a single SFS/RD fee to all nuclear facilities storing spent fuel on-site, regardless of the elected wet or dry storage option, or whether the reactors are operational or shut down. (Rabideau, Tr. 5220-22, 5273-5274; EX 84.) Unlike the previous fee structure in which the NRC assessed a fee for each dry storage facility at a plant, holders of more than one dry storage facility license now only pay one uniform fee. (Rabideau, Tr. 5259-60; EX 84.) NRC documents indicate that the 1999 fee modifications contemplated an increase in dry fuel storage operations within the nuclear industry due to DOE's failure to collect spent fuel, and the impact of those operations on NRC's costs. (EX 24-M at X506 (citing delay in DOE's collection of spent fuel as a reason to seek legislation to collect costs to support the NRC's spent fuel storage activities.).)

Entergy's claim is for the increased NRC Part 171 fees it paid from 2002 to 2008 for spent fuel costs. Entergy's claim consists of the total spent fuel storage component of the Part 171 fee, including both wet and dry storage. (Ford, Tr. 5100; Metcalfe, Tr. 4791-92.) Under the facts presented, it is undeniable that Entergy's Part 171 fees increased due to DOE's failure to perform. It is also reasonable to conclude that the NRC's increased fees were foreseeable at the time of executing the Standard Contract in 1983. Although the precise mechanism for imposing the increased NRC fees was not in place, it is logical to assume that increased regulatory oversight would occur if nuclear plant owners were forced to store more spent fuel on their premises due to DOE's breach.

The Court recently addressed the issue of increased NRC fees in Wisconsin Electric Power Co., 90 Fed. Cl. at 782-86. In that case, the Court acknowledged the foreseeability of increased NRC oversight due to DOE's breach. Id. at 784 ("[T]he production of energy

from nuclear sources is one of the most highly regulated human activities." (quoting Commonwealth Edison Co. v. United States, 271 F.3d 1327, 1348 (Fed. Cir. 2001)). The Court also observed that "[l]icensing and other fees assessed on mitigating substitute performance have been included in damages in other cases." Id. (citing Dominion Res., 84 Fed. Cl. at 274; Carolina Power, 82 Fed. Cl. at 49; Northern States, 78 Fed. Cl. at 469-70).

The Court in Wisconsin Electric summarized plaintiff's position, which is much the same as Entergy's position here.

> [Plaintiff's] position is that these fees would not have been assessed in the non-breach world because the NRC would not have been concerned with mounting storage needs and favoring wet storage over dry. In the non-breach world, fewer than ten [dry storage facilities] would have been constructed. Thus, the class of [dry storage] licensees would have been small, fewer than "all licensees." The fee could not have been imposed across the industry in the non-breach world because the NRC may only allocate generic fees "fairly and equitably" among licensees. 42 U.S.C. § 2214(c)(3). In the non-breach world, dry storage fees would have remained specific to those utilities with dry storage which would not have included [plaintiff]. [Plaintiff] also cites the testimony of Jack Gadzala who worked for the NRC from 1988 to 1997, that in his opinion, if DOE had performed, the NRC would never [have] imposed this fee.

Wis. Elec. Power Co., 90 Fed. Cl. at 785 (footnote omitted). Despite plaintiff's rather compelling position, the Court concluded that plaintiff's claim for increased NRC fees should be denied because plaintiff did not show that the fees were "incremental," meaning that plaintiff would not have paid NRC fees in these amounts if DOE had performed. Id. at 786. The Court relied upon the testimony of the NRC's Mr. Peter Rabideau, who stated that the NRC fee change "would have occurred in 1999 even if DOE had begun performance in 1998." Id.

In the present case, the Court finds that Entergy's evidence offered even a stronger position than the plaintiff in Wisconsin Electric. Entergy introduced NRC Commissioner Merrifield's comments on the FY 1999 Fee Rule, noting that the fee change "should result in a more even and fair recovery policy for various decommissioning and storage activities," and that "it is unfortunate that the federal government has not provided for permanent disposal of high-level waste." (EX 24-M at X506.) These comments confirm the existence of a direct link between DOE's breach and the NRC's 1999 fee change. Absent DOE's breach, the NRC most likely would not have modified its fee structure, because the number of dry storage facilities would have been too few to warrant any change.

The problem confronting Entergy is to show with reasonable certainty what the amount of the increased NRC fees was. In this regard, the Court is guided by the principle that, where the breaching party's liability is clear, Defendant should not benefit just because the ascertainment of damages is difficult. LaSalle Talman Bank v. United States, 317 F.3d 1363, 1374 (Fed. Cir. 2003) ("[W]hen damages are hard to estimate, the burden of imprecision does not fall on the innocent party."); Bluebonnet Sav. Bank, 266 F.3d at 1355 ("The ascertainment of damages is not an exact science, and where responsibility for damage is clear, it is not essential that the amount thereof be ascertainable with absolute exactness or mathematical precision."); Locke v. United States, 151 Ct. Cl. 262, 283 F.2d 521, 524 (1960) ("The defendant who has wrongfully broken a contract should not be permitted to reap advantage from his own wrong by insisting on proof which by reason of his breach is unobtainable.").

Here, Entergy's expert, Mr. Kenneth Metcalfe, prepared an extremely detailed estimate. (Metcalfe, Tr. 4778-4811; EDX 20 at 63-72.) For each of the years 2002 through 2008, Mr. Metcalfe calculated the amount of increased NRC fees by multiplying the Indian Point SFS/RD fee by the estimated spent fuel storage-related percentage. (Metcalfe, Tr. 4784-85; EDX 20 at 65.) Mr. Metcalfe derived the spent fuel storage-related percentages from prior deposition testimony of the NRC's Mr. Rabideau in the Wisconsin Electric case. (Metcalfe, Tr. 4792-93.) The resulting amounts by year are: 2002 – $333,166; 2003 – $468,866; 2004 – $301,780; 2005 – $251,602; 2006 – $286,972; 2007 – $272,749; 2008 – $233,766. (EDX 20 at 64.) Defendant has not challenged for any year either the SFS/RD fees for Indian Point, or the percentages provided by Mr. Rabideau in his deposition.

Defendant's chief argument in opposition is that the NRC fees are unrelated to, and not affected by, DOE's breach, but this position is plainly contradicted by the facts. While Entergy's claim includes all of the spent fuel component of the Part 171 fees, there is no clear way to differentiate between fees associated with wet storage and fees associated with dry storage. However, if DOE had performed as promised under the Standard Contract, even a significant portion of the wet storage fee likely would have been unnecessary. The Court is satisfied that Mr. Metcalfe's detailed estimate meets the requirement to show damages with reasonable certainty. The Court cannot deny this claim just because mathematical precision is difficult. Accordingly, Entergy's claim for increased NRC fees in the amount of $2,148,901 is granted.

16. Internal Labor Costs

Defendant questions $834,965 of Entergy's internal labor costs stemming from the fact that Entergy's time management records do not provide a description, other than project codes, of the tasks performed by employees on specific projects. (Def.'s Post-Trial Br. at 222-23.) The records for outside contractors do, however, permit a review of the tasks

performed by reference to purchase orders. (Schwartz, Tr. 3610-11.) Defendant's expert, Mr. Peterson, expressed the view that a correlation existed between the amount of internal labor devoted to overseeing a work order, and the dollar amounts paid to outside contractors pursuant to that work order. (Peterson, Tr. 5687-88.) Since Defendant opposed some of the work orders claimed by Entergy, Mr. Peterson determined that appropriate amounts of internal labor charges should be deducted for the disputed work orders. (Peterson, Tr. 5688-90; DDX 6 at 45.) Accordingly, Mr. Peterson deducted a portion of Entergy's internal labor costs based upon the ratio of questioned procurement dollars to total procurement dollars. Id.

The Court, however, has not sustained Defendant's position on all of the contested claim items. For those claim items where Defendant challenged Entergy's internal labor costs, but where the Court granted Entergy's claim, the internal labor costs must be added back into the damages award. This step must be performed for the following claims: removal of diesel tanks, disposal of radioactive waste, damaged fuel canisters, Unit 2 spent fuel characterization and visual inspection, Unit 1 crane refurbishment, and the Unit 1 fuel handling tools refurbishment. The total Entergy internal labor costs allowed through this process is $212,957. The amount awarded by individual claim item is shown in the summary chart at the end of this opinion.

The above treatment of internal labor costs is consistent with this Court's prior rulings that a utility's internal labor costs are "incremental" to DOE's breach. See e.g., Sys. Fuels I, 79 Fed. Cl. at 67 (finding charges for internal labor should be allowed as mitigation costs, without reduction); Carolina Power & Light Co., 82 Fed. Cl. at 47-48 (noting the Government's admission that its internal labor cost deduction previously had been considered by the Court and rejected); Sys. Fuels II, 78 Fed. Cl. at 797-98 (rejecting the Government's argument that internal labor costs are not incremental). The Court sees no reason to deviate from these precedents in this case. See Sacramento Mun. Util. Dist., 293 Fed. Appx. at 773 ("Thus to recover internal labor costs incurred in mitigation of the Government's breach, SMUD must prove that it did in fact use its own employees in its mitigation efforts, and the number of hours those employees spent on mitigation related projects.").

17. Overhead "Loaders"

Entergy has included in its claim two types of overhead charges that are applied to the direct costs allegedly attributable to DOE's breach. These charges consist of $6,894,662 from a capital suspense pool, and $1,183,789 from a materials overhead account.[12] (Peterson, Tr. 5647-48, 5661; DDX 6 at 14, 20.) Defendant challenges the capital suspense and materials overhead "loaders" because they are fixed costs to Entergy that did not increase due

[12] Entergy's claim also includes a payroll overhead "loader," which Defendant does not contest in this case. See Tr. 4389-90 (Court's exchange with Defendant's counsel).

to DOE's breach. (Def.'s Post-Trial Br. at 224-25 (citing Sacramento Mun. Util. Dist., 70 Fed. Cl. at 377 (rejecting overhead charges where plaintiff failed to meet burden of proving that costs were incremental to DOE's delay in accepting spent fuel); Tenn. Valley Auth., 69 Fed. Cl. at 542 (rejecting claimed "capital support" overhead expenses consisting of management allocations where plaintiff failed to show any relationship between the overhead charges and the dry fuel storage project).))

Entergy maintains that its overhead loaders reflect actual costs of doing business, and that its allocation of the costs is in accord with FERC regulations, Generally Accepted Accounting Principles, the Federal Acquisition Regulation, and the Cost Accounting Standards. (Entergy's Post-Trial Br. at 159-60.) Entergy also relies upon the Federal Circuit's decision in Carolina Power & Light Co., acknowledging that, if breach-related projects did not receive a portion of the overhead allocation, "other activities would have assumed a disproportionate amount of the total overhead costs." 573 F.3d at 1277. Defendant bears the burden of showing that the overhead loaders applied in Entergy's accounting system were unreasonable and should be disallowed. Sys. Fuels I, 79 Fed. Cl. at 64.

a. Capital Suspense Loader

Entergy's capital suspense loader captures overhead costs associated with the overseeing of capital projects. (DaBello, Tr. 4403-04, 4421-22.) On a company-wide basis, Entergy typically will have as many as 20,000 capital projects in progress at any given time. (DaBello, Tr. 4435.) The capital suspense loader consists of an administrative and general ("A&G") pool and a nuclear-specific pool. (DaBello, Tr. 4406.) The A&G pool includes a corporate property accounting group that supports all of Entergy's capital projects in both nuclear and fossil fuel plants. (DaBello, Tr. 4408, 4431, 4434-35.) The nuclear-specific pool includes personnel charges from Entergy's Nuclear Northeast offices in White Plains, New York. (DaBello, Tr. 4408-09.) This office oversees Entergy's performance at six nuclear plants in the northeast United States. (DaBello, Tr. 4447.)

Entergy employees bill their time to the capital suspense pool whenever the time spent on a specific project is less than 30 minutes. (DaBello, Tr. 4429.) Entergy calculates a capital suspense loader rate on a quarterly basis, adjusting for fluctuations in the overall pool. (DaBello, Tr. 4413-14.) Entergy's objective is to apply all of the capital suspense pool costs to capital projects as an allocated overhead charge. (DaBello, Tr. 4412, 4415.) Defendant's expert, Mr. Peterson, observed that Entergy's capital suspense rate varied widely during the claim years, but that the size of the overhead pool did not correlate to the underlying amount of capital project activity. (Peterson, Tr. 5650-57; DDX 6 at 17, 18.) Mr. Peterson stated that the capital suspense pool could be regarded as a variable cost if there were any correlation between the pool and the underlying activity, but absent such correlation, the capital suspense pool operated as a fixed cost. (Peterson, Tr. 5654-55; DDX 6 at 17.)

The Court accepts that the capital suspense pool represents legitimate costs of doing business to Entergy, but the method employed to charge time to these pools and allocate them to capital projects is very imprecise. Whether the Indian Point breach-related projects received a capital suspense loader charge depends more on the number of sub-30-minute employee time charges than anything else. The fact that time entries of greater than 30 minutes were charged as direct costs to specific capital projects suggests that the 30-minute threshold simply was an arbitrary cut-off point imposed for ease of company accounting. The arbitrary imposition of the rate and the underlying imprecision, without any direct tie to Indian Point projects caused by DOE's delay, makes the recovery of capital suspense loader charges dubious.

In System Fuels I, our Court addressed the plaintiff's capital suspense loader charges for the very same entity and the very same accounting system at issue here. 79 Fed. Cl. at 64. The Court observed:

> As a general matter, the concept that an entity incurs overhead costs in administering capital projects is not troublesome, and System Fuels has established that the capital projects involved with the [dry storage facility] required analysis, review, and approval both at Entergy's corporate headquarters in New Orleans and at the Entergy Nuclear headquarters in Jackson, Mississippi. However, in this instance, the capital suspense loader is problematic. System Fuels' accounting system was able to track costs of administering capital projects, so long as an employee spent one-half hour or more on a particular task. Those costs of administration are thus included as direct charges in System Fuels' claimed costs. The capital suspense loader is designed to capture and provide a rough means of allocating the costs resulting from instances when an employee spends time in training or a short period of time (less than one-half hour) on a task and consequently does not record that time against a particular capital work order. The resulting allocation of that time to all extant capital projects is necessarily imprecise, to the point that this loader is much akin to a charge for general management supervision.

Id. (record citations omitted). Based upon this analysis, the Court in System Fuels I denied the capital suspense loader charges. Id. at 65. Here, the Court fully agrees with System Fuels I, and denies Entergy's capital suspense loader claim.

b. Materials Loader

Entergy maintains a storeroom at Indian Point that contains an inventory of tools, parts, and supplies to support on-site projects and operations. (Bryars, Tr. 4478.) The materials loader overhead charge is a method for allocating these necessary indirect costs to the projects they service. (Bryars, Tr. 4462-63.) The materials overhead charges represent legitimate costs of doing business, and "in essence, [are] a component of the costs of material." (Bryars, Tr. 4474.) The costs in the materials overhead pool consist of the fully loaded payroll and expenses for storeroom personnel, procurement personnel, and corporate support activities such as accounting and information technology. (Bryars, Tr. 4462.) The materials loader rate is calculated individually for each Entergy plant, based upon inventory levels, procurement needs, and current projects. (Bryars, Tr. 4466, 4475-76.) The materials loader is the rate multiplied by the value of the underlying material. (Bryars, Tr. 4464, 4472-73.) The rate is reviewed monthly by comparing the actual costs with budgeted amounts in a forecast model. (Bryars, Tr. 4474.)

As in System Fuels I, involving the same entity and the same accounting system, the Court finds here that "[t]he materials loader has a specific focus in the activities to supply tools and materials for the mitigating activities." 79 Fed. Cl. at 65. Entergy's performance of storeroom supply and procurement functions through a central unit is reasonable and necessary. The costs of operating these functions through an allocated overhead charge, in compliance with FERC guidelines and Generally Accepted Accounting Principles, are allowable as part of Entergy's damages. Accordingly, Entergy's materials loader charge is granted to the extent of $1,143,612 based upon the amount of the underlying claims that are granted. The awarded amounts are shown in the summary of Entergy's damages at the end of this opinion.

18. Cost of Capital

Entergy claims $20,838,626 in "cost of capital" damages. (Peterson, Tr. 5629-30; DDX 6, at 6-8.) The inclusion of this item is designed to compensate Entergy for the loss of the time value of its money. (Metcalfe, Tr. 4930-31.) Entergy did not incur any debt to fund any of the expenditures for which it seeks recovery. (Metcalfe, Tr. 4930-31; Peterson, Tr. 5631.) Entergy financed the breach-related projects with its own corporate equity and general corporate debt. Id. Defendant's expert, Mr. Peterson, testified that Entergy's "cost of capital" claim is the same as a claim for interest. (Peterson, Tr. 5630; DDX 6 at 8.)

Under 28 U.S.C. § 2516(a) (2006), a party may not recover interest on a claim against the United States in this Court unless specifically permitted under a contract or an Act of Congress. See also England v. Conte Advanced Sys., Inc., 384 F.3d 1372, 1379 (Fed. Cir. 2004) ("[T]he no-interest rule is an aspect of the basic rule of sovereign immunity"). As Defendant correctly points out, no provision of the Standard Contract, or the NWPA, or any

other Act of Congress mandates that the United States pay interest on damages claims in spent nuclear fuel cases. (Def.'s Post-Trial Br. at 243 (citing Maine Yankee Atomic Power Co. v. United States, 225 F.3d 1336, 1340 (Fed. Cir. 2000)). Absent a contractual or congressional waiver of sovereign immunity, Entergy's claims are subject to the statutory "no-interest rule."

Entergy's expert, Mr. Metcalfe, calculated the "cost of capital" claim by using a "weighted average cost of debt," based upon interest that Entergy's parent corporation incurred. (Peterson, Tr. 5630.) Entergy relies upon Wickham Contracting Co. v. Fisher for the proposition that interest can be awarded "as part of an equitable adjustment under a fixed-price contract if the contractor has actually paid interest because of the government's delay in payment." 12 F.3d 1574, 1582-83 (Fed. Cir. 1994). Defendant counters that Wickham is inapplicable to the facts of this case because the contract in Wickham involved a "Changes" clause authorizing the recovery of interest to address a contract change. (Def.'s Post-Trial Br. at 246, n.54.) Despite the existence of the "Changes" clause, the Federal Circuit in Wickham ultimately rejected the contractor's claim for interest on equity capital. Wickham, 12 F.3d at 1582. The court noted, however, that "[a]lthough interest on equity capital is not recoverable, a contractor may recover interest actually paid on funds borrowed because of the government's delay in payments and used on the delayed contract." Id. In Wickham, the interest claim failed because plaintiff did not use borrowed funds to perform a breach-related project, and could not show that any specific borrowings occurred because of the Government's actions. Id. at 1583. The same is true here.

The Court has addressed cost of capital, financing, or interest claims in other spent nuclear fuel decisions, and in all but one of them, the Court has rejected the plaintiff's claim. See, e.g. Wis. Elec. Power Co., 90 Fed. Cl. at 794-799; Consumers Energy Co., 84 Fed. Cl. at 674; Dominion Res., Inc., 84 Fed. Cl. at 285; Carolina Power & Light Co., 82 Fed. Cl. at 53; Sys. Fuels I, 79 Fed. Cl. at 69; Northern States Power Co., 78 Fed. Cl. at 471-72. In the recent case of Energy Northwest v. United States, the Court reached a different result, because the plaintiff incurred interest costs on borrowings specifically to perform mitigation projects after DOE's breach. 91 Fed. Cl. 531, 559 (2010) (citing Ind. Mich., 422 F.3d at 1375). Energy Northwest's costs were "directly traceable to the borrowing for the capital expenditure" to construct a dry storage facility. Id. Here, however, Entergy has not shown any causal connection between a specific borrowing and a breach-related project. Accordingly, Entergy's cost of capital claim is denied.

Summary of Entergy's Damages Award

The starting point for Entergy's damages is the $89,388,884 claim amount that Defendant does not contest. As summarized in the following chart, the Court's rejection of many of Defendant's proposed deductions results in a corresponding increase to Entergy's award. The Court has categorized the disputed damages according to Defendant's proposed

deductions. Where appropriate, amounts for the materials overhead loader and internal labor charges have been added.

Description of Item	Amount (Less Overhead/Internal Labor)	Materials Loader	Internal Labor Relating to Activities	Total[13]
Uncontested Amount	$89,388,884	$1,027,728	---	$90,416,612
Unit 1 O&M Costs (2004-2208)	$6,745,092	---	---	$6,745,092
Unit 1 North Curtain Drain Project	$863,414	$51,532	---	$914,945
Removal of Diesel Tanks	$203,758	---	$6,191	$209,949
Disposal of Radioactive Waste	$674,095	---	$28,543	$702,638
Damaged Fuel Canisters	$1,681,807	$54,922	$49,064	$1,785,792
Loading Activities	$1,272,760	---	---	$1,272,760
Unit 1 Crane Upgrade	$1,184,310	$9,430	$71,263	$1,265,003
Unit 1 Fuel Handling Tools Refurbishment	$88,082	---	$3,645	$91,727
Unit 2 Spent Fuel Characterization	$515,855	---	$54,251	$570,106
Additional NRC Fees	$2,148,901	---	---	$2,148,901
TOTAL	**$104,766,958**	**$1,143,612**	**$212,957**	**$106,123,527**

[13] Minor discrepancies exist due to rounding to nearest dollar.

Conclusion

Based upon the foregoing, the Court finds that Con Ed is entitled to recover $448,859 and Entergy is entitled to recover $106,123,527 due to DOE's partial breach of the Standard Contract. The Clerk shall enter final judgment against Defendant in these amounts. Pursuant to Rule 54(d), the Court awards costs to Defendant as the prevailing party against Con Ed, and to Entergy as the prevailing party against Defendant.

Within ten days, on or before May 17, 2010, counsel for the parties shall carefully review this opinion for any proprietary, confidential, or other protected information, and submit to the Court proposed redactions, if any, before the opinion is released for publication. The Court has prepared this opinion with the intent of disclosing the entire contents to the public. Therefore, any proposed redactions must be well supported with an explanation of the specific reasons and authorities.

IT IS SO ORDERED.

s/Thomas C. Wheeler
THOMAS C. WHEELER
Judge